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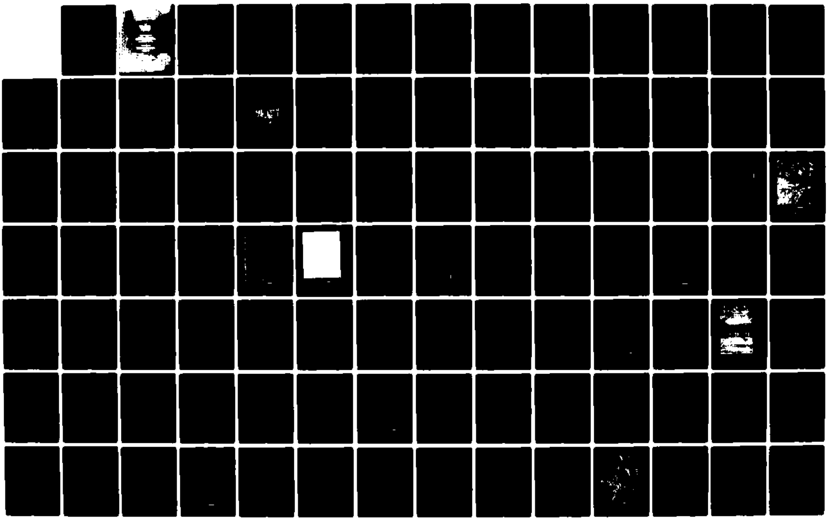

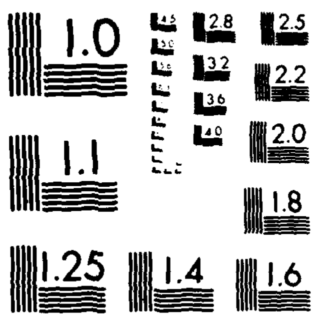

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:EPORT DOCUMENTATION PAGE | 1. REPORT NO. | 2. AD-A136 24F | 3. Recipient's Accession No.

Title and Subtitle
An intensive survey of a 2,200 acre tract within a proposed maneuver area at the Fort Benning Military Reservation, Chattahoochee County, Georgia

5. Report Date
1983

6.

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8. Performing Organization Rept. No.
71

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Pollock, Louisiana 71467

10. Project/Task/Work Unit No.

11. Contract(C) or Grant(G) No.
(C) CX5000-2-0087
(G)

12. Sponsoring Organization Name and Address
Department of the Army, Headquarters, United States Army ıfantry Center and Fort Benning

13. Type of Report & Period Covered
Final 1981-1983

14.

L Supplementary Notes
roject administered by Archeological Services Branch, Division of National Register Programs, National Park Service, Southeast Region, Atlanta, Georgia

Abstract (Limit: 200 words)
In December, 1981, New World Research, Inc., conducted an intensive cultural resources survey of 2,200 ac in the Fort Benning Military Reservation, Alabama and Georgia. The ›rk was performed under Contract No. CX5000-2-0087 for the Archeological Services Branch, ivision of National Register Programs, National Park Service, Southeast Region with funding provided by the Department of the Army, Headquarters, United States Infantry Center ıd Fort Benning. As part of the scope of work, the applicability of a model of site ›cation formulated by Remote Sensing Analysts (RSA) was to be tested (Kohler et al. 1980). ihe NWR survey identified or relocated 37 sites, including 20 prehistoric, 15 historic and two prehistoric/historic sites; in addition, 32 isolated finds were also recorded. The ›del developed by RSA was tested and found to be substantially correct, though mapping problems were identified. The results from the 2,200 ac survey were extrapolated using the refined computer model to the entire 22,000 ac maneuver area in order to define ›cations of potential high, medium and low site probability.

. Document Analysis a. Descriptors
ɜeorgia, prehistory; Chattahoochee County, history; Weeden Island-Swift Creek; Bartram's Trail-Federal Road; Bartram's Trail-Fort Gaines Road; Matthews/Hollis Mill; Discriminant ıalysis/Archaeological Models

b. Identifiers/Open-Ended Terms
tatistical Analysis-Prehistoric data; Sample survey-Archaeological reconnaissance; ιnattahoochee River drainage; Georgia, prehistory; Georgia, history

c. COSATI Field/Group

18. Availability Statement
DISTRIBUTION STATEMENT A
Approved for public release;
Distribution Unlimited

19. Security Class (This Report)

20. Security Class (This Page)

21. No. of Pages
244

22. Price

AN INTENSIVE SURVEY OF A 2,200 ACRE TRACT WITHIN A PROPOSED MANEUVER AREA AT THE FORT BENNING MILITARY RESERVATION, CHATTAHOOCHEE COUNTY, GEORGIA

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Project Administered By

Archeological Services Branch,
Division of National Register Programs,
National Park Service, Southeast Region
Atlanta, Georgia
(Contract No. CX5000-2-0087)

Project Funded By

Department of the Army, Headquarters
United States Army Infantry Center
and
Fort Benning

New World Research, Inc.
Report of Investigations No. 71

1983

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POPULAR ABSTRACT

Under contract with the Archeological Services Branch, Division of National Register Programs, National Park Service, Southeast Region, New World Research, Inc., conducted a sample survey of a proposed 22,000 ac maneuver tract at Fort Benning Military Reservation, Alabama and Georgia. The sample area 2,200 ac tract, pre-selected by the contracting agency, represented ten percent of the proposed maneuver area. The survey identified or relocated 37 sites, of which 20 were prehistoric, 15 were historic and two were prehistoric/historic; in addition, 32 isolated finds were also recorded. Using these data, an existing model developed by Remote Sensing Analysts (RSA) was evaluated for applicability and found to be generally sound except for some mapping problems. Statistical analysis of our data provided additional data on site location which was used to refine RSA's model within the 22,000 ac maneuver area. This refinement also enabled us to correct for the mapping errors noted in our evaluation of the model.

ABSTRACT

In December, 1981, New World Research, Inc. conducted an intensive cultural resources survey of 2,200 ac in the Fort Benning Military Reservation, Alabama and Georgia. The work was performed under Contract No. CX5000-2-0087 for the Archeological Services Branch, Division of National Register Programs, National Park Service, Southeast Region. As part of the scope-of-work, the applicability of a model of site location formulated by Remote Sensing Analysts (RSA) was to be tested (Kohler et al. 1980). The survey identified or relocated 37 sites, including 20 prehistoric, 15 historic, and two prehistoric/historic sites; in addition, 32 isolated finds were identified and recorded. The model developed by RSA was tested and found to be generally correct, though mapping problems were identified. Results from the 2,200-ac survey were extrapolated using the refined computer model to the entire 22,000-ac maneuver area to highlight locations of potential archaeological sites.

ACKNOWLEDGMENTS

The authors wish to acknowledge several individuals whose involvement in the Fort Benning project contributed to its success in varying ways and during various stages of the work. Foremost, we would like to thank the Contracting Officer's Authorized Representative, Edwin A. Hession of the Archeological Services Branch, Division of National Register Programs, National Park Service, Southeast Region. His advice and consultation was most helpful from the beginning to ending stages of investigation.

Timothy Mullen, of the Fort Benning Directorate of Engineering and Housing, offered us assistance in the field on numerous occasions.

Several persons offered information on specific areas of past or current research. These individuals include Donald Thompson, with Remote Sensing Analysts, John Metcalf, an area historian, and Frank Schnell, archaeologist with the Columbus Museum of Arts and Sciences.

In addition, Timothy Kohler, archaeologist at Washington State University, reviewed our draft report and offered very substantive comments for report improvement. Dr. Kohler was the senior author on Remote Sensing Analysts' earlier Fort Benning project report and helped to clarify many aspects of their work and provided a little friendly criticism of some portions of ours, all of which made for a better final report on the 2,200 ac survey.

The computer analyses were handled at two different times, the first using facilities at the University of Arizona. For helping us with the initial steps in this work, we would like to acknowledge Martin Rose of the Laboratory of Tree-Ring Research, University of

Arizona. The second round of analyses were undertaken by Richard Baumgartner and Kathy Bagley-Baumgartner at the University of Texas Medical Center, Houston.

Finally, we would like to acknowledge the help of permanent and temporary NWR staff for their contribution to different aspects of the project.

Jeffrey Homburg	Crew Chief
Carey Dean Terry Jackson Robert Martin	Field Crew
Susan Keuer-Jones	Drafter
Joyce Barnhill	Office Manager
Renee Morrison	Typist

CHAPTER ONE

INTRODUCTION

The cultural resources survey of Fort Benning that is detailed in this report was carried out by New World Research, Inc. (NWR) in December, 1981. The work was conducted for the Department of the Army, Headquarters, United States Army Infantry Center and Fort Benning and administered with funds transferred to the Archeological Services Branch, Division of National Register Programs, National Park Service, Southeast Region (ASB).

Following several previous studies at Fort Benning (Chase 1955, 1958, 1978a, 1978b; Cottier 1977; Kohler et al. 1980; Braley and Wood 1981; Schnell 1981), the current work focused on a pre-selected ten percent sample tract within a larger, 22,000 acre (ac) maneuver area (Figure 1). This project represents the first professional and intensive archaeological investigation to be undertaken in the 2,200 ac.

In accord with governmental regulations concerning non-renewable cultural resources, the work was conducted according to the requirements of the National Historic Preservation Act (Public Law 89-665) as amended, Executive Order 11593 (Protection and Enhancement of the Cultural Environment) and Procedures for the Protection of Historic and Cultural Properties (36 CFR 800). In addition, all policies established by the Georgia Archaeological Survey and any military regulations pertinent to the conduct of the project were carefully followed.

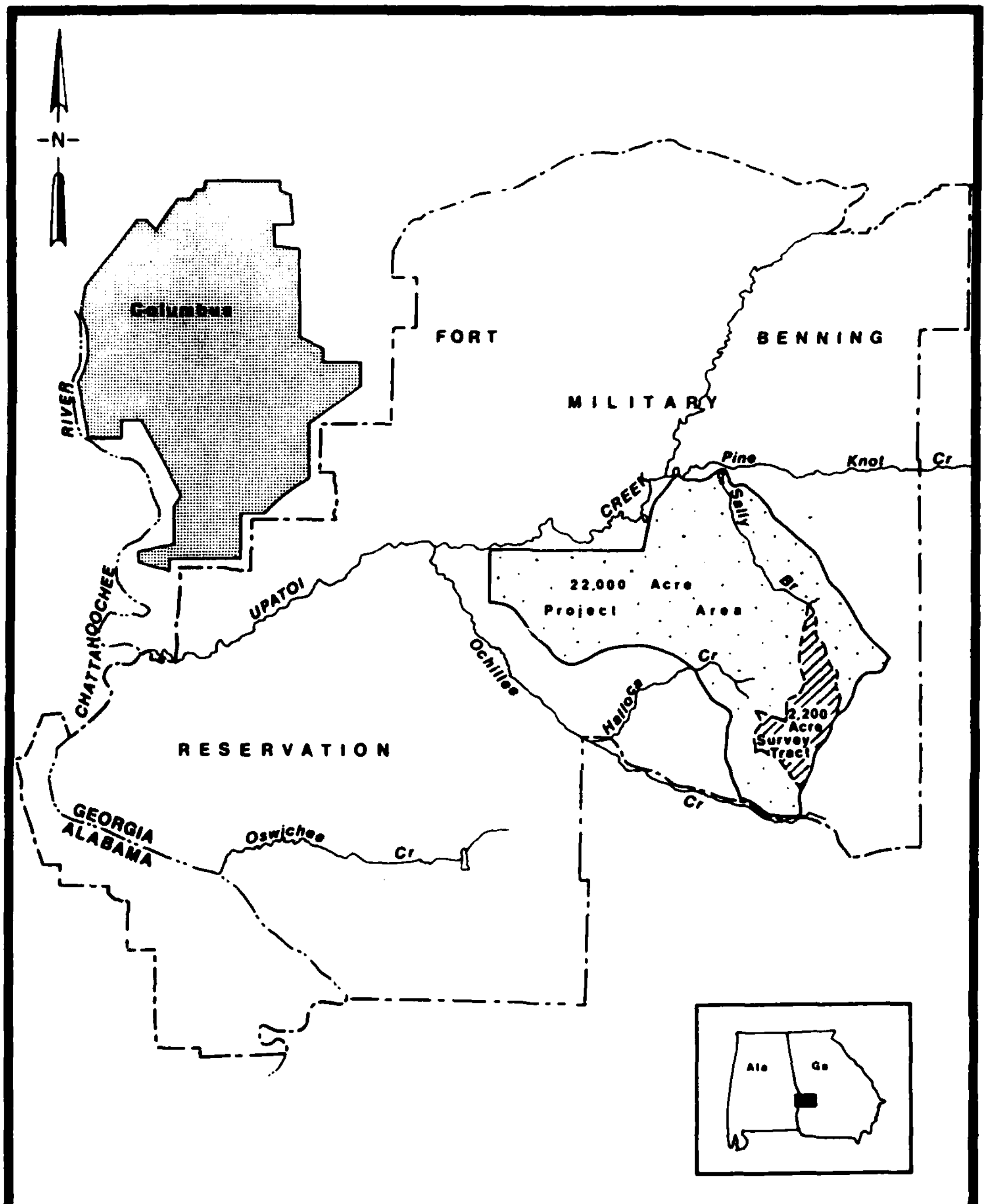

FIGURE 1. PROPOSED 22,000 AC MANEUVER AREA AND 2,200 AC SAMPLE SURVEY TRACT SHOWN IN RELATION TO THEIR LOCATION WITHIN FORT BENNING AND SURROUNDING AREA

NWR

PROJECT SETTING

Fort Benning occupies portions of eastern Alabama and western Georgia. It comprises an irregularly-shaped block of land, with the long axis running northeast to southwest. Coursing through the southwest extreme of the Fort is the Chattahoochee River, and one of its tributaries, Upatoi Creek, extends up the long axis of the Fort. The block of land that comprises Fort Benning is somewhat constricted in the middle, and along that constriction runs Ochillee Creek, a tributary of the Upatoi. Within the rough triangle formed by Upatoi and Pine Knot Creeks to the north, the Ochillee to the west and south, and the boundary of the Fort to the east, lies the proposed 22,000 ac maneuver area.

With the exception of the southern extreme of the 22,000 ac, the borders of the maneuver area do not impinge on either the streams mentioned above, or their adjacent alluvial bottomlands. The only stream with appreciable bottomlands within the maneuver area is Sally Branch, which flows into Pine Knot Creek to the north (Figure 2).

FIGURE 2. GENERAL VIEW OF THE FLOODPLAIN OF SALLY BRANCH, LOOKING SOUTH.

Although Sally Branch was included, the maneuver area boundaries were drawn up so as to avoid much of the bottomlands associated with Halloca Creek, a tributary of the Ochillee. The resultant block of land comprising the 22,000 ac maneuver area has two arms, one extending to the west and the other to the south, each flanked by the bottomlands of Halloca Creek. Within the southern arm of the maneuver area is the irregularly shaped sliver of land encompassing approximately 2,200 ac, or ten percent of the maneuver area, surveyed by NWR.

Most of the 183,000 ac comprising Fort Benning is hilly and covered with slash and long-leaf pine; however, the project area also contains oak and oak/hickory uplands, bottomland hardwoods, wooded swamps, and mixed pine-hardwood stands.

In terms of precise location within Fort Benning, the 2,200 ac survey area is comprised of Range Compartments F-1, G-2, G-3, and I-4. It lies approximately 22.4 km (14 mi) southeast of Columbus, Georgia, just east of U.S. Highway 27 and 280, and north of State Highway 26. It is wholly within Chattahoochee County, Georgia.

PROJECT REQUIREMENTS

The main objective of NWR's study was the evaluation of a 22,000 ac tract proposed for maneuver exercises. In this evaluation, we were also to consider the applicability of a model developed by Remote Sensing Analysts (RSA) (Kohler et al. 1980). RSA's work is thoroughly discussed in subsequent chapters, but briefly their model was based on data derived from a survey of the Halloca Creek area of Fort Benning. Since the boundaries of the proposed 22,000 ac maneuver area were deliberately established to avoid most of the Halloca Creek bottomlands, the clear majority of RSA's survey tract was outside the maneuver area.

This study provided an opportunity to determine if the variable combinations that defined site location in RSA's model could be extrapolated to the maneuver area. On the basis of our results, RSA's model was evaluated and refined. In addition to testing the previous model, NWR was requested to provide recommendations for management of recorded cultural resources.

PROJECT SUMMARY

The project included: 1) a literature and background search; 2) preliminary evaluation of RSA's model; 3) pedestrian survey (with subsurface testing where necessary); 4) data analysis; 5) extrapolation of results to the entire 22,000 ac maneuver area; and 6) report preparation. A total of 69 cultural resources were identified, including 32 isolated finds, 20 prehistoric sites, 15 historic sites, and two prehistoric/historic sites. Two of the prehistoric sites were previously recorded and revisited during our survey (9Ce51 and 9Ce93).

RSA's model was tested through the comparison of data sets and statistical testing and found to be generally applicable; however, NWR's study uncovered several problems with RSA's probability map that predominantly focused on scale. Alternatives for correcting or adjusting for these problems have been developed and are presented in the report.

Each phase of the project is thoroughly described in the ensuing chapters. Results of the work and recommendations are also presented.

CHAPTER TWO

PREHISTORY: AN EVALUATION OF THE DATA BASE AND CURRENT KNOWLEDGE

Introduction

Fort Benning is encompassed within the Lower Chattahoochee River Valley archaeological sub-area (Kohler et al. 1980). The previous investigations and applicable culture sequence for the sub-area have been very thoroughly treated by RSA's study (Kohler et al. 1980), Chase (n.d.a, n.d.c, n.d.d, 1955, 1958, 1978a, 1978b), Braley and Wood (1981), and Cottier (1977). The thrust of this discussion, therefore, is not toward a reiteration of available syntheses, but rather toward an evaluation of the available data and the status of knowledge achieved by the previous work.

In terms of previous work, the project area benefits from a long record of professional inquiry. The earliest published studies were those of Jones (1873), Moore (1907), and Brannon (1909) whose contributions may be categorized as descriptive detail on site configurations and artifact taxonomy. From these beginnings, professional and amateur survey and excavations have continued in the area to the present. The orientation of most of these studies have advanced in keeping with current trends in archaeological theory.

In the report prepared by RSA (Kohler et al. 1980), an annotated bibliography was provided which detailed previous investigations conducted on the Reservation or in close proximity to it. In an effort to update the data, we have prepared Table 1, which lists recent previous investigations, the focus of the work, and the availability of the results. Also included in Table 1 are pertinent details on David Chase's extensive work, the majority of which was not included in RSA's bibliography. Many of these summaries predate RSA's report. As

TABLE 1. RESUME OF PREVIOUS INVESTIGATIONS PERTINENT TO FORT BENNING

Note: This listing represents an update of the detailed annotated bibliography presented in Kohler et al. (1980). For investigations prior to 1979 refer to that publication except in the case of Chase's work.

Investigator	Focus of Work	Availability of Results
Timothy Kohler, Thomas P. Des Jeans, Carl Feiss, and Don E. Thompson	Intensive background and literature review, including annotated bibliography for prehistoric and historic resources in the Fort Benning area; 100 percent pedestrian survey, 4,000 ac; Site definition for 21 prehistoric sites and ten historic sites; Development of a predictive model for prehistoric site location	Publication: An archaeological survey of selected areas of the Fort Benning Military Reservation, Alabama and Georgia. In fulfillment of contract C-5716(78); on file ASB, NPS - Atlanta (1980)
Braley, Chad O. and W. Dean Wood	Background and literature review; Pedestrian survey of 1300 ac to be potentially impacted by Infantry Fighting Vehicle firing; Identification of 21 sites (ten historic; 11 prehistoric)	Publication: Cultural resources survey of the IFV Ranges, Fort Benning, Georgia. Report submitted to Corps of Engineers, Savannah District (1981)
Schnell, Frank T.	Background and literature review of previous work at site 1Ru63 and 9Ce66; Redefinition of both sites' boundaries; Limited testing at both sites; Recommendations for further work at both	Publication: draft report entitled "A cultural resource investigation of sites 1Ru63 and 9Ce66, Fort Benning, Alabama and Georgia. Submitted to Corps of Engineers, Savannah District (1982)

TABLE 1. RESUME OF PREVIOUS INVESTIGATIONS
PERTINENT TO FORT BENNING
(continued)

Investigator	Focus of Work	Availability of Results
NOTE: The following represents a listing of the manuscripts of David W. Chase which were found either on file at the Columbus Museum of Arts and Sciences (CMAS) or at the Fort Benning Museum. They are listed by the reference notation by which they appear on both Table 2 and in the Bibliography of this report. Copies of these manuscripts are now on file at New World Research, Inc.		
Chase (n.d.a.)	Summary of the artifacts and general site characteristics of prehistoric sites in both Fort Benning and the Middle Chattahoochee for the general Archaic Archaic/Woodland transition, and Early Woodland	Manuscript: Archaic to Early Woodland in Georgia (prepared to accompany a 15 min. slide presentation)
Chase (n.d.b.)	Revised version of above	See above
Chase (n.d.c.)	Summary of the archaeological work conducted by Chase and others primarily on Fort Benning. Included are descriptions of several of the principal sites found on the Fort, and a brief description of the work conducted at each.	Manuscript: Background of the Archaeology of the Middle Chattahoochee Valley 1955 - 1963.
Chase (n.d.d.)	Summary of the artifact and site characteristics for the Archaic/Woodland, and Woodland. Includes a complete definition of Upatoi Plain.	Manuscript: Woodland in the Middle Chattahoochee Area
Chase (n.d.e.)	Detailed discussion of the characteristics of the Archaic occupations in the region including chronological chart and line drawings of various artifact types	Manuscript: Part I - Middle Chattahoochee Valley Pre-ceramic

TABLE 1. RESUME OF PREVIOUS INVESTIGATIONS PERTINENT TO FORT BENNING (continued)

Investigator	Focus of Work	Availability of Results
Chase (n.d.f.)	Paper as stated is a synthesis of the current state of work. Includes a brief resume of work prior to 1955. Information presented is more detailed in other period specific papers.	Manuscript: Prehistoric cultures of the Middle Chattahoochee Valley in Synthesis
Chase (n.d.g.)	Summary of work conducted at the Lawson Field Site (9Ce11), including artifact tables. Discussion of both field methods and chronological implications of artifacts is presented.	Manuscript: An Early Woodland site at Lawson Air Field, Fort Benning, Georgia
Chase (n.d.h.)	Essentially field notes covering the emergency salvage operations conducted on a hill behind the Quartermaster Warehouse (Bldg. 1737, Fort Benning) on the 24th and 25th of October, year unspecified.	Manuscript: Part III - The Quartermaster Site (9Ce42)
Chase (n.d.i.)	Summary of excavations conducted at 9Me41 in the Spring of 1959. Included are detailed descriptions of the features excavated with associated artifact tables.	Manuscript: A Late Swift Creek Type Site on the Upatoi Creek (9Me41)
Chase (n.d.j.)	As noted, field summaries of the features excavated at 9Ce75, and artifact analysis sheets for all proveniences. Feature summaries include brief analyses of feature form and contents	Manuscript: untitled field and laboratory notes 9Ce75

TABLE 1. RESUME OF PREVIOUS INVESTIGATIONS
PERTINENT TO FORT BENNING
(continued)

Investigator Investigator	Focus of Work	Availability of Results
Chase (n.d.k.)	Summary of all stages of work conducted at 9Ce75	Manuscript: A Middle Swift Creek Site on the Upatoi Creek (9Ce75)
Chase (n.d.l.)	Field and laboratory summaries for 9Me51 including artifact table from surface collection taken in 1959	Manuscript: 9Me51
Chase (n.d.m.)	Field summary of work conducted at 9Ce19, including site map and artifact tables.	Manuscript: The McBride's Bridge Site (9Ce19)
Chase (n.d.n.)	Field and laboratory notes on the site, including descriptions of the two burials	Manuscript: Engineer's Landing Site - Field Summary
Chase (n.d.o.)	Summary of two visits dated 29 July 1957 and 22 November 1957 to site; cross-section of test trench cleared in July; artifact tables for both excavated and surface materials recovered	Manuscript: Snellings Pond
Chase (n.d.p.)	Essentially hypotheses concerning the chronological and cultural implications of the site, primarily focusing on the associated ceramics and their relationship to Kolomoki defined sequence	Manuscript: The Quartermaster Site Problems and Postulations
Chase (n.d.q.)	Detailed report on the excavations conducted at the site in 1955. Includes field methods, field results, laboratory results, and conclusions.	Manuscript: The Halloca Creek Site

an additional reference to accompany the following discussion, Table 2 lists all of the excavated sites of which we are aware within or in close proximity to Fort Benning.

In reviewing the data supplied by previous studies we have focused on characteristics of the chronological periods with specific attention to settlement patterns. Again, for the sake of brevity, we have summarized the applicable cultural sequence in Figure 3. This figure lists each chronological period by time frame, representative components, and general characteristics. Below is a summary of major points for the different periods.

Paleo-Indian Period

As with much of the Southeast, the Paleo-Indian period is poorly defined. Kohler et al. (1980:13) indicate Paleo-Indian remains are scarce, noting one probable fluted point base from the Oliver Basin (McMichael and Kellar 1960) and none from the Rother L. Harris Reservoir (Knight 1977). They further indicate a complete absence of pre-Paleo-Indian occupation (Kohler et al. 1980:13).

DeJarnette et al. (1975) note, however, that four fluted points were identified in the private collection of Dr. R.B. McCann of Seale, Russell County, Alabama, approximately ten miles west of the Chattahoochee River. The points were recovered from surface contexts either in plowed fields or from hilltops in the highlands of the Chattahoochee drainage. During the course of work on the Walter F. George Reservoir project, another fluted point was recovered from the race track vicinity south of Columbus, Georgia (DeJarnette et al. 1975:26).

The data suggest that throughout the Lower Chattahoochee River Valley, evidence of Paleo-Indian occupation, though sparse, is present. Regrettably, finds dating to the period are infrequently located and often appear as isolated occurrences (DeJarnette et al. 1975; Chase n.d.c., 1955). While a rather substantial number of sites have been excavated in the Fort Benning vicinity, only one fluted point is known on Fort, at Lawson Field (Frank Schnell, personal communication, 12 April 1983). In light of this fact, the as yet ill-defined presence of Paleo-Indians in this region may have cultural origins.

In other words, for some as yet unexplained cultural reason, Paleo-Indians seemingly shunned the area. Alternatively, the Pleistocene climate of the area may not have hosted the environmental features that provided the economic base of Paleo-Indians, although the results of the Early Man studies on the Tennessee-Tombigbee Waterway indicate that climatic and other environmental factors would have been favorable to occupation (Muto and Gunn 1981). One explanation may be sampling error: the Paleo-Indian finds documented to date appear to be occurring in the margins of the river valley, while the concentration of effort has been in the river valley proper (DeJarnette et al. 1975; Huscher 1964a, 1964b).

TABLE 2. DATA CONCERNING EXCAVATED SITES, FORT BENNING MILITARY RESERVATION AND NEAR VICINITY

Site	Reference	Cultural Affiliation	Notes
Lawson Field (9Ce1) [Halls Upper Landing: Moore 1907]	Moore 1907; Willey and Sears 1952	Chattahoochee Brushed; Ocmulgee Fields Incised; Kasita Red Filmed; Historic Creek	Kashita settlement [Kasita Site], tested by Willey 1938
Halloca Creek Site (9Ce4)	Chase n.d.a., n.d.q., 1955, 1958; Kohler et al. 1980	Mossy Oak Simple Stamped; Cartersville/Deptford; Early Swift Creek; Lamar; Minor: fabric-impressed and fiber-tempered	20 ft sq unit; Shovel tests; Features A-I (primarily Early Swift Creek) Hearth A; Features 1-4 (outside main excavation); Burial I
Engineer's Landing (9Ce5)	Chase n.d.n.	Bull Creek Focus Ocmulgee Fields I Abercrombie Phase	Test excavations in western and center portion of site (Huscher 1959); burials removed by Chase in 1955; site just off reservation on Upatoi Creek
Lawson Field Site #1 (9Ce11)	Chase n.d.c.: 4; n.d.g.	Early Woodland; Middle Woodland; Averett Focus	Destroyed in 1959; Six test trenches
Box Springs Road (9Ce16)	Chase n.d.c.: 2 Chase 1978b	Archaic, Early Woodland, Middle Swift Creek	Tested 1955
Snellings Pond Site (9Ce20)	Chase n.d.c.: 2; n.d.d.:2; n.d.o.	Cartersville/Deptford	Tested 1955
Quartermaster Warehouse (9Ce42)	Chase n.d.c.: 2 Chase n.d.p., Chase 1978b	Late Swift Creek, Weeden Island	McMichael, on Oliver Basin survey (1957) aided in excavation of nine of 14 features
Oswichee Creek (9Ce66)	Chase n.d.a, n.d.b; Schnell 1981	Middle Swift Creek	Upatoi Plain first identified

TABLE 2. DATA CONCERNING EXCAVATED SITES, FORT BENNING MILITARY RESERVATION AND NEAR VICINITY (continued)

Site	Reference	Cultural Affiliation	Notes
9Ce75	Chase n.d.j., n.d.k.	Fiber-tempered; Early Woodland; Middle Woodland; Averett Focus	
Baird Site (9Me14 - Power Station Site)	Chase n.d.c.: 3	Middle Swift Creek	Type site for Upatoi complex
Averett Site (9Me15B)	Chase n.d.c.: 3 Chase 1978b	Averett Focus, Late Swift Creek, Weeden Island	Initial work in 1958
Averett Upper Terrace (9Me26)	Chase n.d.b., n.d.c.:3	Middle Swift Creek; Terminal Early Swift Creek	
Sand Hill Site (9Me41) [Opossum Creek; Upatoi Bridge]	Chase n.d.c.: 14	Late Swift Creek Late Woodland Lamar	Tested in 1959; eight features excavated including one burial
Randall Creek Site (9Me51)	Chase n.d.l.	Bull Creek Focus; Early Swift Creek; Cartersville/Deptford; Archaic	Immediately south of Reservation boundary; Unspecified number of shovel tests
Upper Bull Creek (9Me58) [Chase lists as 9Me45]	Chase 1959	Mossy Oak Simple Stamped; Cartersville/Deptford; Middle Swift Creek; Ocmulgee Fields Plain; Kasita Red Filmed; Chattahoochee Brushed Historic Creek	Historic Upatoi (Apatai) town (1780-1820); referenced by Swanton
9Me60 (Walker Street Site: Chase n.d.c.: 10)	Chase n.d.c.: 6	Deptford/Cartersville; Early Swift Creek	Huscher tested with NSF grant in 1963

TABLE 2. DATA CONCERNING EXCAVATED SITES, FORT BENNING MILITARY RESERVATION AND NEAR VICINITY (continued)

Site	Reference	Cultural Affiliation	Notes
Uchee #4 (1Ru58)	Chase n.d.c.: 2; (also referred Chase n.d.c.:12 as 1Ru78 and in Chase n.d.c.: 14 as 1Ru48) Chase 1978a	Late Swift Creek, Weeden Island	Paper presented on excavations at SEAC, 1957, Macon; summarized in Chase 1978a
Kendrick Site [Abercrombie] (1Ru61)	Chase n.d.c.: 4	Averett Complex; Bull Creek Focus	Work first conducted by Peter Brannon, about 1910; Chase in consultation with Huscher in 1957
Yuchi Town Site (1Ru63)	Chase n.d.c.: 19, 1960; Schnell 1981	Ocmulgee Fields	
Uchee #3 (1Ru71)	Chase n.d.d.: 4	Middle to Late Swift Creek	
Pleasant Valley Site (9Sw41)	Chase n.d.c.: 2 Chase 1963	Averett Focus	Tested 1956
Hitchitee Creek Site	Chase n.d.c.: 2	Archaic, Woodland, Mississippian	Tested 1956
Site A (82nd Airborne Division Road)	Chase 1977; Cottier 1977: 23	Lawson Field Phase; Abercrombie Phase; Bull Creek Phase; Lamar; Swift Creek; Cartersville/Deptford	Three units excavated; Two units excavated

FIGURE 3. APPLICABLE CULTURAL SEQUENCES TO THE LATE ARCHAIC TRANSITION, WOODLAND AND MISSISSIPIAN OCCUPATIONS OF THE MIDDLE CHATTAHOOCHEE RIVER VALLEY

Chattahoochee River (Walthall 1980: 38-76, 81, 111, 193)

Time	Phase/Cultural Affiliation
A.D. 1700	Abercrombie
PROTOHISTORIC	
A.D. 1500	Bull Creek
MATURE MISSISSIPPIAN	
A.D. 1200	Rood's Sequence
A.D. 1000	
EARLY MISSISSIPPIAN	
A.D. 900	
	Weeden Island
LATE WOODLAND	
A.D. 500	Late Swift Creek
LATE MIDDLE WOODLAND	
A.D. 100	Early Swift Creek
EARLY MIDDLE WOODLAND	
300 B.C.	Deptford
LATE GULF FORMATIONAL	
500 B.C.	Early Woodland

Oliver Basin (McMichael and Kellar 1960:220)

Time	Complex/Culture
A.D. 1600	Ocmulgee I
A.D. 1500	Bull Creek Focus
A.D. 1250	Lamar
A.D. 1100	Rood's Focus Etowah III/Averett
A.D. 1000	Etowah II (Chat. Variant)
A.D. 800	Late Swift Creek (Oliver Variant)
A.D. 600	Weeden Island (Intrusive)
A.D. 500	Middle Swift Creek
A.D. 200	Early Swift Creek
150 B.C.	Deptford/Cartersville; Mossy Oak
1000 B.C.	Fiber-tempered

Lower Chattahoochee (Jenkins 1978:74)

Time	Complex/Culture	Phase
A.D. 1729	Ocmulgee Fields II	Lawson Field
A.D. 1540	Ocmulgee Fields I	Abercrombie
A.D. 1300	Rood's Creek III	Bull Creek
A.D. 1200	Rood's Creek II	
A.D. 900	Rood's Creek I	
A.D. 800	Weeden Island I	Torreya
A.D. 500	Late Swift Creek - Weeden Island I	Kolomoki
A.D. 300	Early Swift Creek	Mandeville II
100 B.C.	Late Deptford	Mandeville I
500 B.C.	Early Deptford	
1200 B.C.	St. Johns	
2500 B.C.	Stallings Island	

Middle Chattahoochee Simplified Chronology (Chase n.d.c.:2)

Time	Complex/Culture
1750-1836	Late Creek
A.D. 1400	Early Creek
A.D. 1200	Lamar
A.D. 900	Averett
A.D. 600	Late Swift Creek-Weeden Island
A.D. 400	Upatoi (river sites); Middle Swift Creek (streams)
100 B.C.	Early Swift Creek
1500 B.C.	Cartersville/Deptford
2000 B.C.	Stallings

The Archaic Stage

Kohler et al. (1980) discuss the pre-ceramic Archaic phases together, noting that the sequence in Georgia is poorly known. Our review of pertinent data suggests this characterization is not altogether applicable to that area. The data relevant to the Early and Middle Archaic, though admittedly sparse, seems to indicate that, as was the case in the Paleo-Indian period, occupations are restricted in areal distribution, with preferred locations toward the margins of the river valley, or immediately along the principal streams feeding into the Chattahoochee. Huscher (1964a, 1964b) defined an apparently Early Archaic lithic complex following the completion of his work at the Standing Boy site. Chase (n.d.c.) utilized Huscher's (1964a) assemblage criteria of heavily patinated flakes and "spinner" points to identify the presence of Early Archaic occupations within the Fort Benning area. His data are restricted to surface observations, and while excavated sites on the Reservation have yielded evidence of Archaic occupations, none date to the Early or Middle Archaic periods.

Investigations on the Tombigbee, Savannah, and Tennessee Rivers have yielded substantial evidence of Middle Archaic occupations (DeJarnette et al. 1975; Thomas et al. 1981). In the middle Tennessee River valley there are data which indicate a shift in subsistence patterning from preceding periods, with an increasing utilization of shellfish. The absence, therefore, of similar Middle Archaic occupations along the lower Chattahoochee is somewhat surprising. DeJarnette et al. (1975) report Middle Archaic materials from their investigations in the Walter F. George Reservoir, but in very restricted numbers. Of the sites tested during their work, only the McLendon Site (1Ru28) yielded in situ Middle Archaic specimens.

For all of the periods just discussed (Paleo-Indian, Early Archaic and Middle Archaic), we cannot ignore the possibility of site burial in the alluvial bottomlands. Consequently, what appears to be sparse occupation may actually be the result of site masking.

The pre-ceramic Late Archaic period is better defined than the preceding periods, but as was the case with those periods, the data are sparse. Knight (1977) indicates that 1Ra12 may have a pre-ceramic Late Archaic occupation, and Braley and Wood (1981) indicate that sites 9Me74 and 9Me92, located in the North Ruth Range of Fort Benning, also yielded Late Archaic materials.

It is not until the end of the Late Archaic, however, that excavated data are able to lend substance to the discussions. As noted on Table 2, Chase identified Late Archaic occupations marked by the presence of Stallings-like fiber tempered ceramics at the Halloca Creek Site (9Ce4), the Water Tower Site (9Ce33), the McBride's Bridge Site (9Ce19), and 9Ce75. In no instance, however, were the fiber tempered ceramics found in isolation; at Halloca Creek they co-occurred with Dunlap Fabric Impressed, while at the remaining three sites the sherds were associated with both Dunlap Fabric Impressed and Mossy Oak Simple Stamped.

The data from these sites do suggest that by the transition from Late Archaic to Early Woodland an increased dependence on gathered foods was evident. Each of the sites yielded groundstone, and in the case of Halloca Creek, 'netsinkers' (probably used in the process of water boiling as opposed to net sinking) were also identified. In addition to the ceramic vessels, steatite vessel fragments were identified from Halloca Creek. Apparently the tradition of steatite vessel production continued into the Woodland, as fragments were recovered in levels which yielded only Cartersville/Deptford ceramics.

The four sites mentioned above are in diverse physical settings, situated both on the floodplain and toward the valley margin. What is interesting about the distribution of the sites is the apparent non-utilization of locations directly along the Chattahoochee River. Unlike the Stallings occupations of the Savannah River region, which parenthetically date approximately one thousand years prior to the fiber tempered occupations on the Chattahoochee, there is no strong evidence for a marked reliance upon aquatic resources, nor a selection for immediate riverside site locations.

The Ceramic Periods

The pattern of site locations away from the river proper continues into the late Early Woodland and Middle Woodland periods. Although large base camp and possibly village sites are found along the major secondary streams, smaller sites tend to be located toward the valley margins. McMichael and Kellar (1960:182) indicate that both Early and Middle Woodland sites also begin to appear with greater frequency on the first terraces of the river. DeJarnette et al. (1975), however, suggest that both their Ceramic Complex A (Deptford Linear Check Stamped, Deptford Bold Check Stamped, Dunlap Fabric Impressed, and Seale Plain) and Ceramic Complex B (Swift Creek Complicated Stamped, Seale Plain, Weeden Island Plain, Carrabelle Incised, West Florida Cord Marked, and Columbia Utility) sites are typically situated in upland locations.

Although DeJarnette et al. (1975) indicate a low number of both Ceramic Complex A and B sites, subsequent work has shown that the first of the population peaks, based on site density, coincide with the Early and Middle Woodland occupations (Kohler et al. 1980; Braley and Woods 1981; Chase n.d.b., n.d.d., 1978b).

Out of 25 sites Chase is known to have tested, he reported occupations dating to either the Early or Middle Woodland at 16 (Table 2). Three of the sites had ceramic collections dominated by Late Swift Creek and Weeden Island ceramics alone (Uchee #4 [1Ru58]; Quartermaster Site [9Ce42]; Averett Site [9Me15B]). This complex will be returned to shortly. The excavation data from the remaining 13 sites indicate that from the Early Woodland period on there is a reliance upon stored, probably gathered foods. The majority of features excavated were storage pits, though several hearths were also noted. The sites, as stated earlier, tend to cluster along the major secondary streams,

such as Halloca Creek and Upatoi Creek (Chase n.d.c., 1978b), with one site serving as the principal base camp/village, and the remaining sites apparently functioning as short-term camps.

Chase (n.d.c.) does not indicate that any of the sites functioned as work/processing stations, and from the review of his excavation data (Chase n.d.d., n.d.f., n.d.g., 1978a, 1978b), the small sites appear to have functioned as perhaps seasonal-specific encampments. Chase originally postulated that certain of these smaller Middle Woodland sites might have been horticulture work stations, based on the presence of charred corn in an Early Swift Creek feature at 1Ru61 [Abercrombie/Kendrick] (Chase n.d.b.). Subsequent work has indicated, however, that both the site and the feature should be assigned to the Early Mississippian Averett Complex (Chase 1963).

There are data which suggest that from the terminal Late Archaic through the Early Woodland the predominant cultural influences in the Middle Chattahoochee Valley were related to eastern and northeastern Georgia cultural centers (Chase 1978b). By the Middle Woodland, however, the emphasis appears to have shifted away from inland Georgia to the panhandle of Florida. As seen on Figure 3, there is disagreement as to the time of the relative introduction of Swift Creek design motifs into the Middle Chattahoochee. There is, however, little argument that by the latter part of the Middle Woodland both the middle and lower Chattahoochee were the localities of indigenous developments which were influenced by the Gulf tradition in addition to the Piedmont tradition.

Originally, Chase felt that the first expression of such indigenous cultural developments began in the Early Woodland (Chase 1955, n.d.b.). Based primarily on survey work, he identified a plainware ceramic complex which he designated the Upatoi Complex. The plainware was the dominant ceramic type on sites located usually on the first terraces immediately above the Chattahoochee River. His subsequent work at such sites as Oswichee Creek (9Ce66) led to a revision of the temporal placement of the complex and in one paper (Chase n.d.b.) he postulates that the complex coincides temporally with the Middle Swift/Late Swift Creek transition.

The actual temporal position of the Upatoi Complex remains unresolved. Schnell (1982) reports plainware sherds similar to Upatoi Plain in association with Averett, Bull Creek and Abercrombie phase occupations, which would place the type in Mississippian contexts. There is little doubt, based on Chase's work, however, that the first appearance of Upatoi Plain occurs at the Middle to Late Woodland transition and that the distribution of the type is restricted to specific locations, particularly along the Chattahoochee River. Contemporaneous sites along the secondary streams exhibit a virtual absence of the type, and more commonly yield Middle Swift Creek ceramics. The continued manufacture of the type into Mississippian times is not unexpected, especially if the type served primarily a utilitarian function. The apparent distributional differences in the occurrence

of the type could argue for distinctive cultural entities or functional differentiation based on task differentiation. The data are insufficient to support either suggestion, but they do have relevance to both the Swift Creek/Weeden Island and Averett Complexes which temporally post-date the initial appearance of Upatoi.

By the Late Woodland, materials from sites such as Uchee #4 (1Ru58), Quartermaster (9Ce42) and Averett (9Me15B) indicate that the presence of panhandle Florida and Piedmont influences in the Middle Chattahoochee had become better defined. The suggestion has been made that the presence of the Weeden Island ceramics is representative of the maximum northern extent of that cultural entity inland from the coastal regions (Chase 1978a; Schnell et al. 1981; Cottier 1977). There is no doubt that Weeden Island ceramics occur in some numbers at Late Woodland sites in the Fort Benning region, but whether or not their presence represents actual movement of Weeden Island ceramic manufacturers into the region is unclear, and not clarified by the limited excavations of Late Woodland sites in the area.

It is apparent that the trend in site locations identified for the Early and Middle Woodland continues through the Late Woodland into the Early Mississippian Averett Complex. Unlike Roods Creek I (Figure 3), sites on the Lower Chattahoochee, which are situated adjacent to the Chattahoochee, the Averett Complex village locations tend to be located slightly upstream on secondary drainages. It is not until Mature Mississippian that the village/mound sites in the Fort Benning region begin to appear in numbers along the river. The shift in village site patterning does not reflect, however, a disuse of the secondary stream localities, which continue to be marked by the presence of well-appointed village and support sites. The same site distributional pattern continues into the protohistoric period. All indications point to the period of maximum population concentrations in the Fort Benning region coinciding with the various Mississippian manifestations.

CHAPTER THREE

HISTORY: AN EXAMINATION OF REGIONAL IMPLICATIONS AND SETTLEMENT REMAINS

As with the prehistory, previous investigators have provided rather thorough discussions of the historical developments which shaped and characterize the project area. In particular, RSA's (Kohler et al. 1980) treatment of regional history was so sufficiently detailed that reiteration here would simply be an exercise in redundancy. Consequently, we have summarized the account of principal ethnohistoric and historic events in Table 3. [Note: some of these are well documented while others are based on reconstruction.] What is necessary, in this chapter, is some brief attention to regional political and social events that provide a framework for interpreting the historic site data.

SUMMARY OF REGIONAL EVENTS

Major Anglo-American settlement did not begin in what is now eastern Chattahoochee County until the mid- to late 1820s. In 1825-26, lands between the Flint and Chattahoochee Rivers in west Georgia were surveyed by Georgia state officials prior to the official removal of the Creek Indians from those lands. Large-scale Anglo-American immigration commenced at that time. Among the first individuals who moved into the area was a Revolutionary War veteran, John O'Quinn, and his wife; their graves are presently located on the Fort Benning Military Reservation.

TABLE 3. SUMMARY OF PERTINENT AREAL AND PROJECT-SPECIFIC HISTORIC EVENTS

CHRONOLOGICAL PERIOD	REGIONAL EVENT	AREAL SIGNIFICANCE	PRESENT EXPRESSION
Exploration	DeSoto 1540 Expedition	Possible id. of location of the Kasita village of Cofitachequi	none confirmed
	± 1575 Laudonnier Expedition	Id. of village of Chiquola which may correspond to Cofitachequi	none confirmed
Colonization	Spanish 1679 mission (failed) at Sabacola	Spanish trade with Lower Creek	17th century trade items (continuing Spanish trade through 18th century)
	Spanish 1681 mission (failed) at Sabacola		
	Henry Woodward (1685) periodic trading expeditions	English trade with Lower Creek	17th and 18th century trade items
	Spanish 1689-1691 presidio at Apalachicola	Military presence	1Ru101
Post-Yamassee War (1715)	Resettlement of Creek, Yuchi, Kolomi, Atasi, and Tuskegee into designated, pre-selected locations in Chattahoochee drainage	Yuchi village	1Ru63
		Yuchi village (Captain Ellick's Town)	9Ce66 (other village locations documented but no field id.)
British	1739 Treaty between Ogelthorpe (Georgia Colony) and Creeks confirm. land grants	confirmation of Indian presence	(see above Yuchi)
	± 1772 (confirmed reference; reconfirmed by Bartram's 1776 account)	Lower Creek Trading Path	Portions of path follow present routes of First Division, Fort Gaines, and Federal Roads

TABLE 3. SUMMARY OF PERTINENT AREAL AND PROJECT-SPECIFIC HISTORIC EVENTS (CONTINUES)

CHRONOLOGICAL PERIOD	REGIONAL EVENT	AREAL SIGNIFICANCE	PRESENT EXPRESSION
Federal (pre-lottery)	1780-1825 post Revolutionary War pre Indian removal	Anglo settlement in general Fort Benning region	John O'Quinn and wife grave locations
	1780-1825 transport routes	St. Mary's Road	just prior to Civil War known as Wire Road; now the Red Diamond Rd.
		Columbus-Tazewell Rd.	now referred to as the Buena Vista Road
	1780-1825 settlement	Calfrey's Inn Stand (Moss's Trading Camp)	none confirmed
		Hamly Farmstead	none confirmed in field; documents indicate in District 5, Lot 60
	1817 military	Fort Mitchell	excavated (Chase 1974)
Antebellum	1825-1860 transport routes	Box Springs Road	present location
	1832 settlement	Vicinity of Cook Cemetery (Fort Benning Cem. #52)	9Ce150 (District 5, Lot 60; area of site in vicinity of Hamly, Cook and Redd Homesites
	1832 (deed recorded 1836)	Eelbeck Mill (saw and grist)	District 9, Lot 241 (owned by Cook-see above); now ruined
	1836	Henry King Plantation	ruins of Big House reported by RSA (Kohler et al. 1980)

TABLE 3. SUMMARY OF PERTINENT AREAL AND PROJECT-SPECIFIC HISTORIC EVENTS (CONTINUES)

CHRONOLOGICAL PERIOD	REGIONAL EVENT	AREAL SIGNIFICANCE	PRESENT EXPRESSION
	± 1840	Hickey-Patterson Farmstead (families represented at assoc. Ft. Benning Cem. #43 include Hickey, Jones, Patterson)	RSA 28
	unknown date but prior to Civil War	Culpepper Farm and and Cemetery	District 5, Lots 38 & 39
		Halloca Community (near intersection of First Division and Hourglass roads)	no direct field evidence but within RSA project area, may be related to historic sites found during that project
Post-bellum	± 1865	Matthews/Hollis Mill (in vicinity of Schley Pond)	as late as 1944 still shown on military maps; no longer present
	± 1880	Underwood Mill (in operation from 1880-1940)	destroyed with military acquisition of property
	1910	King Family Holding (in vicinity of Schley Pond)	9Ce144
World War I	1918-1921	Initial land purchases for Camp Benning	Land and struc. clearance on purchased land
World War II	1941	large block purchases for Ft. Benning	see above

Although other white settlers trickled into the project area prior to the initial survey, most potential immigrants were restrained not only by the official designation of these lands as Creek territory, but also by the machinations of Spanish and British agents in Florida, who fomented unrest among the Creeks up to and throughout the War of 1812. This external threat to the area was not totally eliminated until the annexation of Florida by the United States in 1819.

The 1825-26 survey divided the entire area between the Flint and Chattahoochee Rivers into districts and lots, with each lot consisting of about 202.5 ac. The lots were numbered and were distributed among the white inhabitants of Georgia by way of a massive lottery. Eligible for the lottery were Georgia citizens, Georgia widows with minor children, and Georgia families with minor orphans (Powell 1931:12). Most of the recipients of these land grants did not occupy their property, but again sold the land to someone else.

Administrative units were soon established in the newly surveyed land. The project area was encompassed by the original bounds of Muscogee County, created in December of 1826 (Powell 1931:12). In December of the following year, Marion County was established, with much of Muscogee County, including what is now east Chattahoochee County, transferred to the new administrative unit (Powell 1931:12). Although the boundary between Marion and Muscogee Counties would change again in 1829, it did not affect the lands south and east of the Upatoi Creek, comprising the present project area.

The settlement of Marion County proceeded rather rapidly in the late 1820s. Homesteads were established along the broad bottoms of the large drainages, or - if in the uplands - near a good spring or creek. The prime agricultural lands of the county, located far to the south of the project area along the Shoal, Buck, Uchee, Kinchafoonee, Muckalee and Lannahassee drainages, were the first to be intensively settled. Soon, grist mills, saw mills and even cotton gins were constructed on the larger creeks. By 1830, Marion County contained 1327 white inhabitants and 109 black slaves (Powell 1931:13).

Marion County suffered some temporary depopulation when many settlers moved back east at the outbreak of the brief Creek War of 1836 (Powell 1931:16), but soon the area had attained sufficient population to justify the creation of another county in between the heartlands of Muscogee and Marion Counties. This county, designated Chattahoochee, was established in 1854.

Just before the creation of Chattahoochee County, west Marion County contained three post offices (Bald Hill, Shell Creek and Halloca) and one town, referred to locally as Sand Town (Rogers 1933:21). During this period, the terrain encompassed by the 22,000 ac maneuver area was referred to locally as the Big Sandy District, and Bush Hill, the highest point of land within the 2,200 ac survey tract, was identified locally as Sand Mountain (John Metcalf, personal communication).

With the establishment of Chattahoochee County, Sand Town was renamed Cusseta, which became the new county seat (Rogers 1933:21). Antebellum Chattahoochee County was essentially comprised of two parts, with Cusseta in the middle. The western portion of the county, generally low-lying and fertile, was conducive to an economy based on planters and their slaves, while the eastern portion, comprised mostly of a sandy, poor soil, was exploited mainly by yeoman farmers having few or no slaves (Rogers 1933:34).

We have no direct evidence of the particular house types preferred by the Antebellum yeoman farmers that moved into the area; almost all local structures dating to that period have been destroyed. The most suitable reference for information on local vernacular architecture comes from information compiled and presented by Eugene Wilson on Alabama folk houses (1975). According to Wilson and data obtained by Kohler et al. (1980:36) from Wilson's unpublished dissertation, the dog trot was the single most popular house type in the area, followed closely by saddlebag, pyramidal-roofed and bungalow types. As was common for this period, almost none of these structures had basements, since the houses were placed on piers. With that kind of structural foundation, these houses probably consisted of only a single story (Kohler et al. 1980:37-38).

The Civil War, and its aftermath, probably had minimal effect on most of the project area, since there were few local plantations to be disrupted. While local cotton gins would certainly have been affected by the plummeting price of cotton in the postbellum South, local farmers who subsisted directly off their food crop probably saw little change in their day-to-day lives.

It must be assumed that this economically depressed way of life was typical for the project area until its acquisition by the U.S. Government in the early 1940s. Although most of the project area was not noted for plantations and slaves prior to the Civil War, there were apparently a number of Blacks, presumably tenant farmers, living in the vicinity of the project area by the 1920s and 1930s. County maps dating to that period and an early Fort Benning military reservation map (Figure 4), show at least two Black schools within the project area, Big Sandy and Grisson. At this time, there were at least 12 Blacks owning property, and presumably living on the land, in the vicinity of Box Springs and Red Diamond Roads (John Metcalf, personal communication).

According to county and local soil maps, it would appear that the period of greatest population density in the project area was the 1920s. The first Chattahoochee County Soil Map, dated to 1928 (Figure 5), but based on 1924 fieldwork, shows many more settlements along the major roads than appear on either a 1939 map of the county (un-reproducible), or a 1943-44 reservation map (Figure 4).

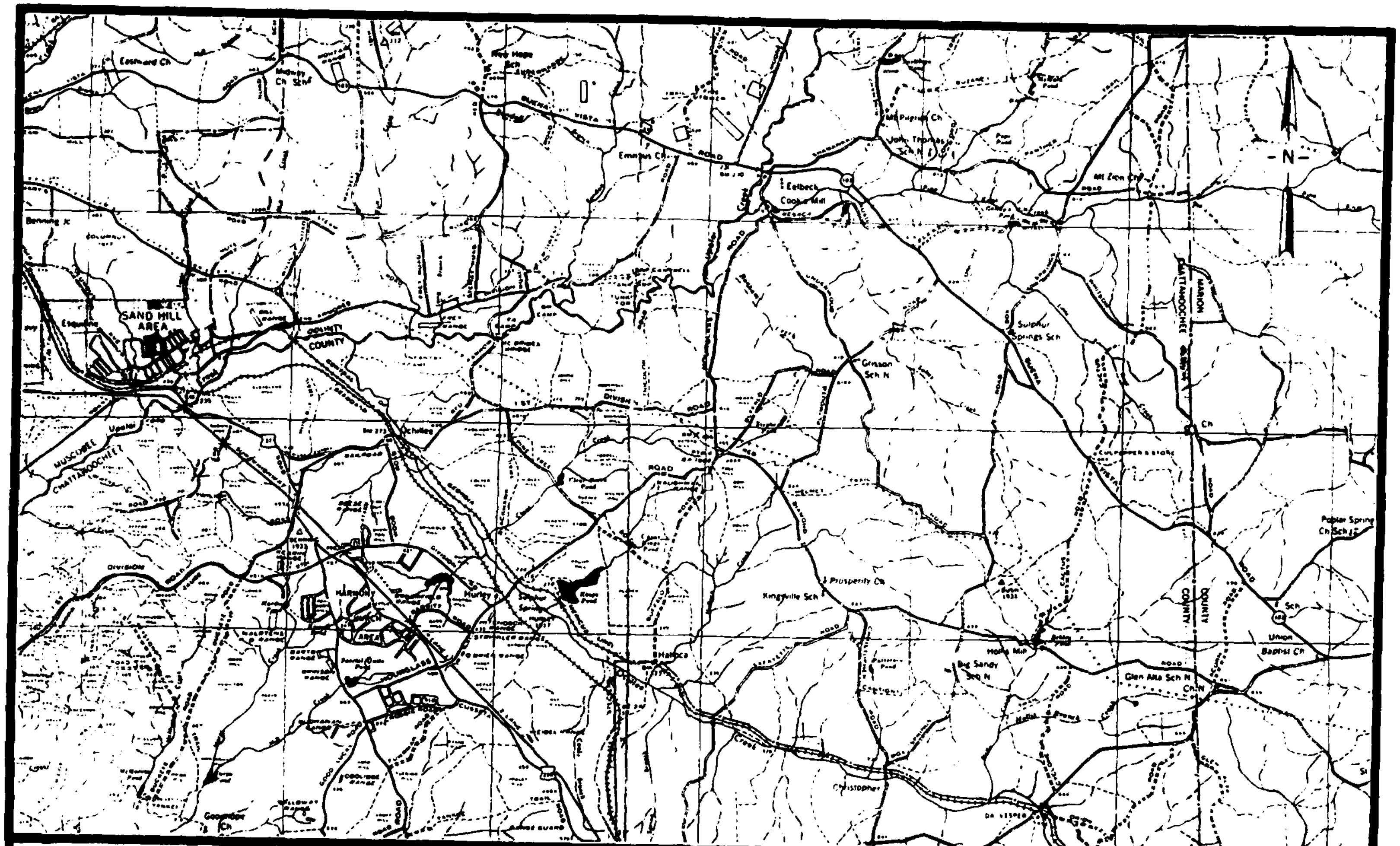

FIGURE 4. 1944 FORT BENNING RESERVATION MAP
(on file at the Fort Benning Infantry Museum).

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FIGURE 5. DETAIL FROM THE 1928 CHATTAHOOCHEE COUNTY SOIL MAP.

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By the early 1940s, all private land within the project area was purchased by the U.S. Government during their final land acquisition program for Fort Benning, originally located in the eastern extreme of Chattahoochee County. Recognizing the commercial advantages of a military installation in the central Chattahoochee Valley, the citizens of Columbus, impressed by the advantages of having had Camp Conrad in the vicinity during the Spanish-American War (Burgard et al. 1941:8), pressed for a permanent military post during World War I. The initial purchases of land for the new Camp (later Fort) Benning occurred in 1918 through 1921. The next large block of purchases, including the project area, occurred in 1941, just prior to the entry of the United States into the Second World War.

During the war, and at least until the 1960s, the project area was used to conduct maneuvers and perform training exercises. Dirt access roads within the area were extensively widened and improved. All civilian structures were removed or allowed to disintegrate, and while no permanent military structures were erected within the project area, many military constructions of a temporary nature, such as fox holes, bunkers, command posts and simulated missile implacements, have been constructed within the project area in the recent past. The present 22,000 ac proposed maneuver area will be used for a much more ambitious undertaking: a maneuver area to be established for testing the high-speed infantry-fighting vehicle, the 'Omar Bradley' (Dick Grube, personal communication).

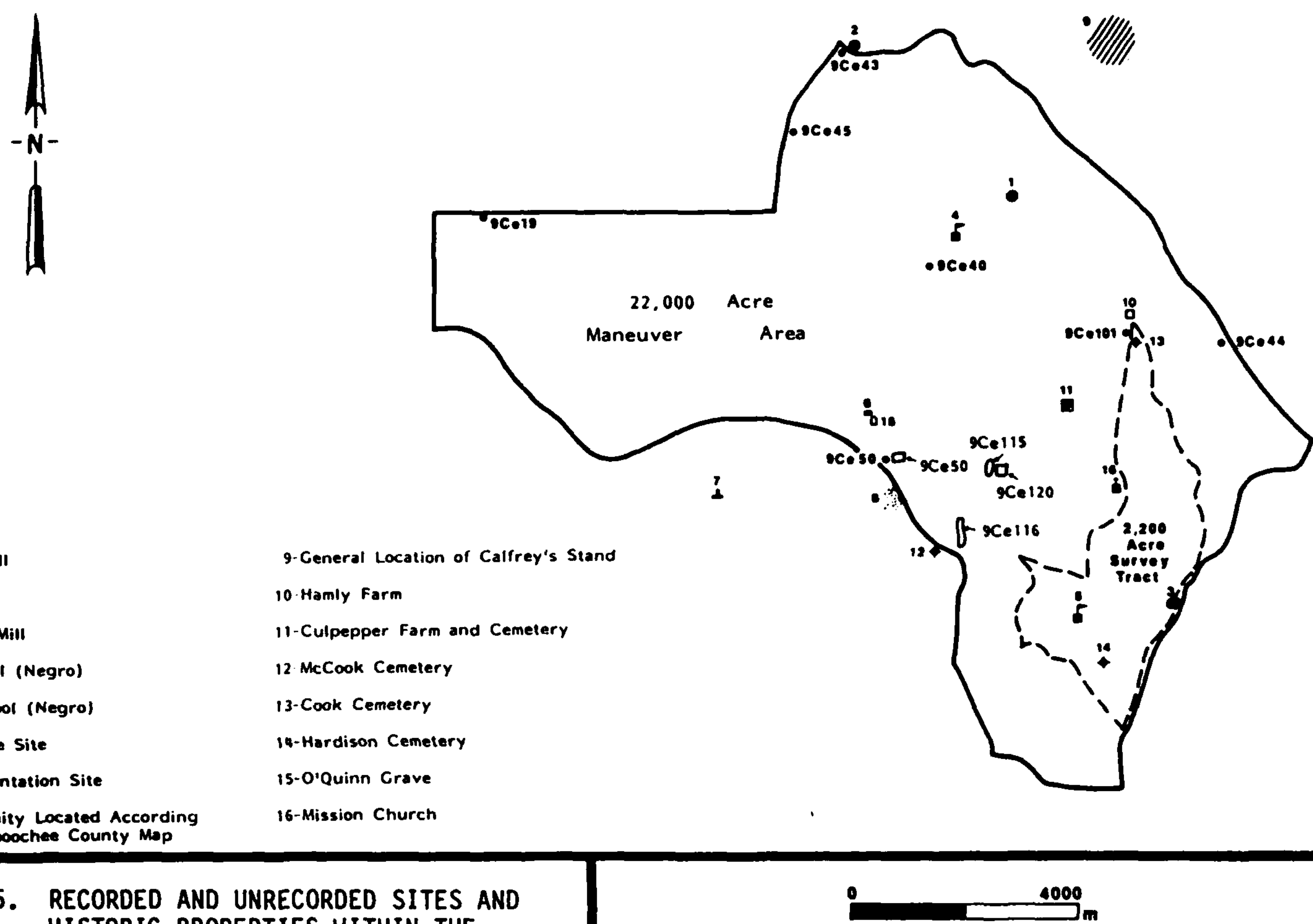
SETTLEMENT REMAINS

The historic remains in the project area should bear witness to the developments reviewed above. To interpret properly the nature of these remains and to evaluate their significance in terms of potential eligibility to the National Register of Historic Places, an examination of documented sites is warranted. Presented in two sections below, this examination covers first those sites either within or just outside the 22,000 ac proposed maneuver area, but not encompassed by our ten percent sample survey tract. Discussed second are those sites within our 2,200 ac sample survey area.

22,000 Ac Maneuver Area and Immediate Vicinity

An Examination of Recorded Historic Sites

Unfortunately, there are only two previously known and recorded historic sites within the 22,000 ac maneuver area. One, 9Ce101, is just outside of the 2,200 ac sample survey tract, not far from Sally Branch. The other, 9Ce120, also known as the Hickey site, was discovered by RSA during their survey of the Halloca Creek Basin (Figure 6). Also illustrated on Figure 6 are the remaining historic and prehistoric properties known within the 22,000 ac proposed maneuver area.



1-Underwood's Mill
2 Eelbeck Mill
3-Matthew/Hollis Mill
4-Grisson's School (Negro)
5-Big Sandy School (Negro)
6-Patterson House Site
7-Henry King Plantation Site
8-Halloca Community Located According to 1869 Chattahoochee County Map
9-General Location of Calfrey's Stand
10-Hamly Farm
11-Culpepper Farm and Cemetery
12 McCook Cemetery
13-Cook Cemetery
14-Hardison Cemetery
15-O'Quinn Grave
16-Mission Church

FIGURE 6. RECORDED AND UNRECORDED SITES AND HISTORIC PROPERTIES WITHIN THE 22,000 AC PROPOSED MANEUVER AREA.

NWR

9Ce101: This historic site is located just south of Sally Branch and west of the present Box Springs Road. According to the site form on file with the Georgia Archaeological Survey, 9Ce101 is a 'late 18th century homestead or trading post site' originally recorded by David W. Chase.

If the 18th century date on the state site form is credible, this would be one of the earliest Euro-American settlements within the bounds of Fort Benning. If that were the case, it would almost surely be a homestead, since the site's location is too distant from the main road and other settlements to be a very accessible 'trading post' in what was still sparsely populated Creek territory. Otherwise, an early homestead at this location is certainly possible, for although the original 1826 survey map of the area does not indicate the remains of a structure at the location of 9Ce101, four structures associated with the name 'Hamly,' are indicated on the northern side of Sally Branch.

Questions, however, have been raised about the location and date of 9Ce101. Mr. Frank Schnell, archaeologist on staff with the Columbus Museum of Arts and Sciences, believes it possible that the 'homestead site' (9Ce101) is misplotted, and that its actual location should be where 9Ce93 is presently located. Since the artifactual collection from 9Ce93 dates that site to the late 19th - early 20th century, there is a possibility that the '18th century' mentioned on the state site form for 9Ce101 is a typographical error, and should, in fact, be '19th century.' This is only supposition, but it does indicate that the site should be subjected to another field check before definitive statements can be made about its age and function.

9Ce120: Also referred to as the Hickey site, 9Ce120 (RSA 28) is an historic site with a non-diagnostic prehistoric component. Recovered from the site during the 1978 survey were 68 historic ceramic sherds, glass and metal fragments; the prehistoric material consisted of 37 lithic flakes, and it was assumed that this aboriginal material was due to an overlap between 9Ce120 and a nearby aboriginal site, 9Ce115 (RSA 23).

The historic artifacts represent the remains of the Hickey family dwelling and associated constructions. Together with the artifacts, a number of structural remains were also present at the time of the 1978 survey: the footing piers for four structures; four chimney falls; remnants of a cistern; a brick-lined walkway, and a cemetery (Fort Benning Cemetery #43) associated with the family. The cemetery, located 30 m northwest of the site, contains eight marked graves, bearing the family names of Hickey, Patterson and Jones. The death dates range from 1853 to 1907. The 1853 date, plus the presence at the site of pearlware sherds, not commonly found after the first half of the 19th century, indicate an Antebellum occupation at the site (Kohler et al. 1980:130). The presence of unmarked graves within the cemetery may suggest that the Hickey's owned at least a few slaves during that period.

An Examination of Unrecorded Sites

While there are only two previously recorded historic sites within the 22,000 ac proposed maneuver area, there are a number of other historic properties that have been identified from either historic maps or other research material. They have been identified by name, and are listed below:

O'Quinn Grave
Hamly Farm
Patterson House
Halloca Community
Culpepper Farm and Cemetery
Underwood's Mill

O'Quinn Grave: John O'Quinn, a private in a North Carolina regiment during the American Revolution, is buried immediately east of Box Springs Road, just north of the Halloca Creek area surveyed by RSA. O'Quinn, who died in 1835, is one of the few Revolutionary War veterans buried in the Fort Benning/Columbus area (John Metcalf, personal communication).

Hamly Farm: On the original 1826 survey map of the project area (Figure 7), four structures are shown just north of Sally Branch in Lot 60 of District 5. A small path connects these structures with a field located just south of Sally Branch. According to the 1826 map, the small complex was the Hamly Farm. Hamly, of mixed Creek and Euro-American ancestry, is also mentioned in the memoirs of Lafayette's secretary on the occasion of that Frenchman's 1825 journey through the Lower Creek communities on the Chattahoochee River (John Metcalf, personal communication).

Patterson House: This house site has been tentatively located on the east side of Red Diamond Road, only about 100 m from the O'Quinn grave. The Patterson house was constructed by Robert K. Patterson (1814-1890), who originally was retained to build the Hickey house in 1840. At about the time that Patterson married Sarah Hickey in 1848, he built his own residence. In later years, Patterson became assistant post master for the Halloca post office. A more detailed examination of the Patterson genealogy is provided in Rogers (1933:162) and for that reason will not be recapitulated in this discussion.

Halloca Community: Shown on the 1869 map of Chattahoochee County (Figure 8), the Halloca settlement is located along what later became Red Diamond Road, just south of Halloca Creek. This would place it within the Halloca Creek area surveyed by RSA. John Metcalf, however, places the community near the intersection of First Division and Hourglass Roads. Not much is known of this community except that it contained a post office from well before the Civil War until 1882. Due to its proximity to the King, Patterson and Hickey holdings, the Halloca Community probably contained a few stores to serve the local residents.

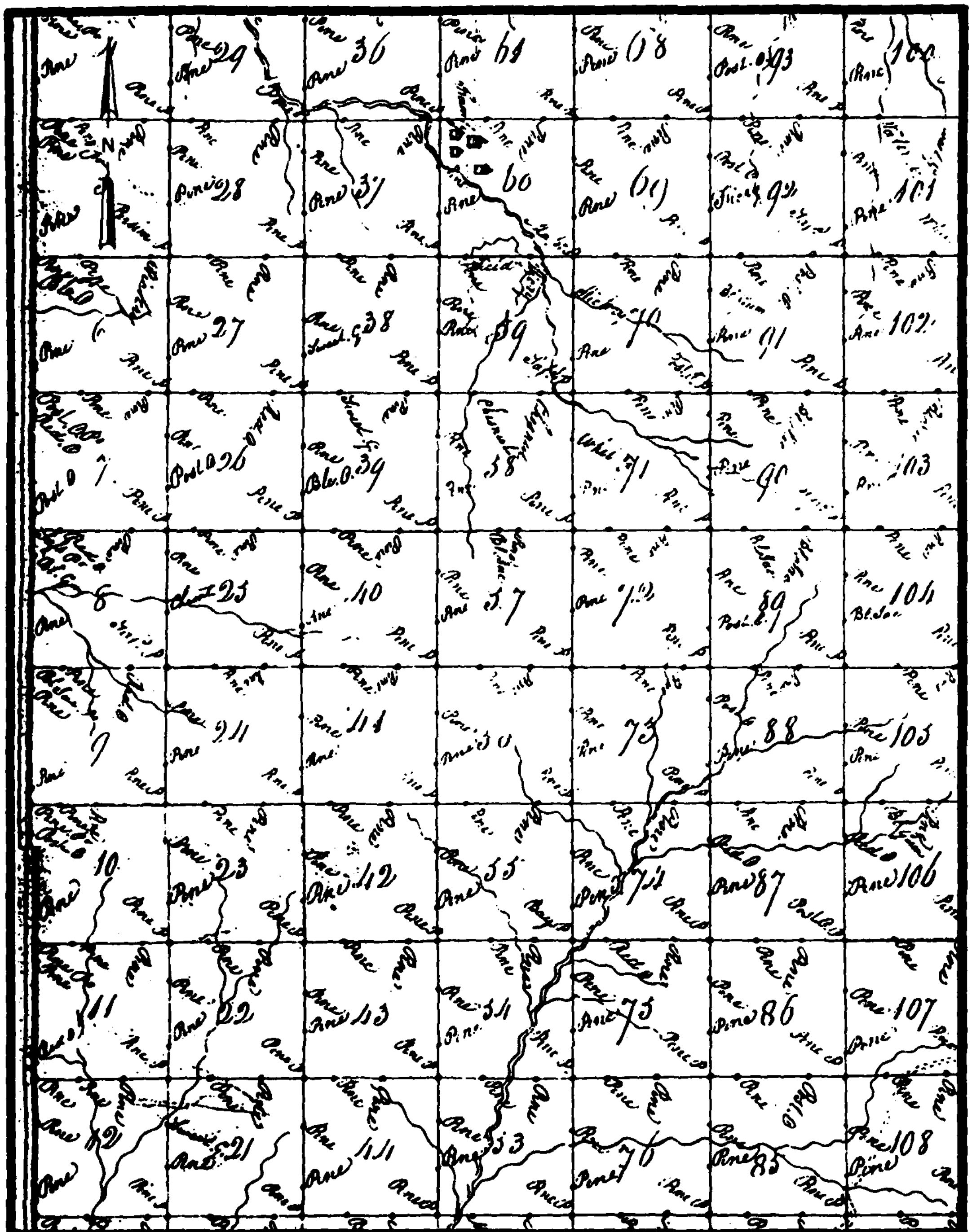


FIGURE 7. 1826 SURVEY MAP SHOWING INDIVIDUAL LOTS (map copy obtained from the Georgia Department of State).

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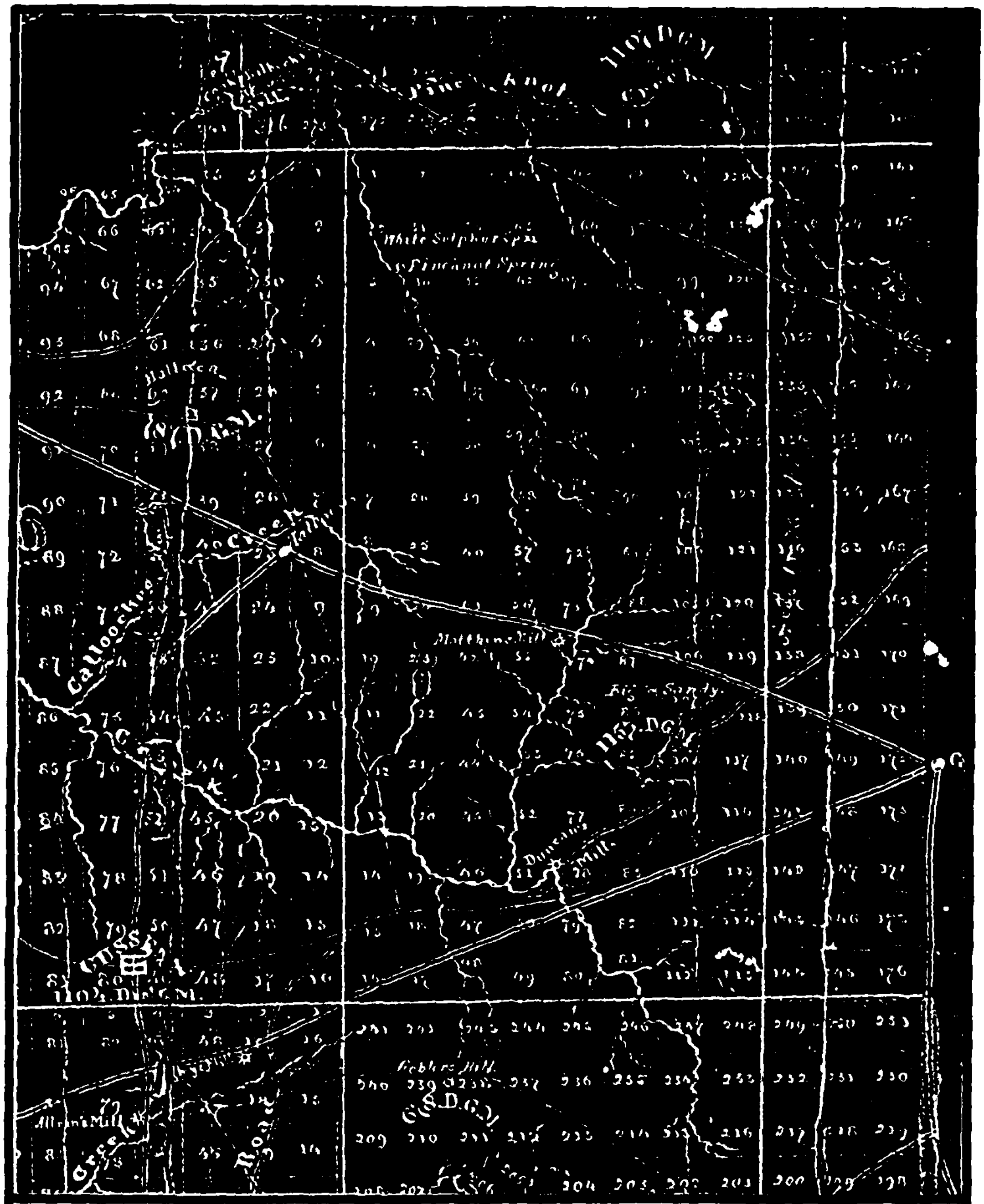

FIGURE 8. 1869 CHATTAHOOCHEE COUNTY MAP (on file at the Chattahoochee County Courthouse).

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Culpepper Farm and Cemetery: At some point before the Civil War, a Christopher Culpepper moved into the area and purchased land, perhaps Lot 38 of District 5. Upon his death, he was buried in the southwest corner of the lot. Culpepper's two sons remained in the area; one established his own farm in Lot 39 directly to the south of the original Culpepper holdings. Further genealogical information related to the Culpepper family is provided in Rogers (1933:322-23).

Underwood's Mill: This mill complex was situated on Sally Branch, just south of Plymouth Road. It was built by Charles Underwood around 1880, and was probably in operation until the Federal Government assumed the land title in the 1940s. The Underwood Mill was a focal point for community activities, and dances were held there frequently (John Metcalf, personal communication).

Structural Indications

Aside from these sites identified by name, there are nameless structures indicated on various historic maps. For the 22,000 ac area, these have been omitted from our illustrations since, without field checking, we can do little more than reference their presence on the following maps:

1. 1928 Soil Map for Chattahoochee County;
2. 1939 Map of Chattahoochee County (framed behind glass in the county courthouse in Cusseta); and
3. 1944 Fort Benning map.

Roads

A number of early roads of historic significance passed through or within the vicinity of the 22,000 ac maneuver area. These roads or trails range from the 18th century route of William Bartram, to the system of roads in use in the project area today. Identical roads were not always shown in exactly the same location. Nonetheless, these roads connected points that can be traced through time on the local maps, and roads connecting similar points will be treated as discrete units in the following discussion. The approximate locations of these roads are indicated on Figure 9.

Bartram's Trail - Federal Road: In 1776, the naturalist William Bartram traveled through the northern part of what is now the proposed maneuver area. On his way east from the Yuchi town and Apalachicola, about 12 mi (19.3 km) below Coweta, Bartram followed what was then known as the 'Lower Creek Trading Path,' an Indian trade route also used by Euro-American merchants from Georgia and the Carolinas. The Lower Creek Trading Path essentially followed the fall line from Augusta, through the center of what is now Fort Benning (Kohler et al. 1980:24).

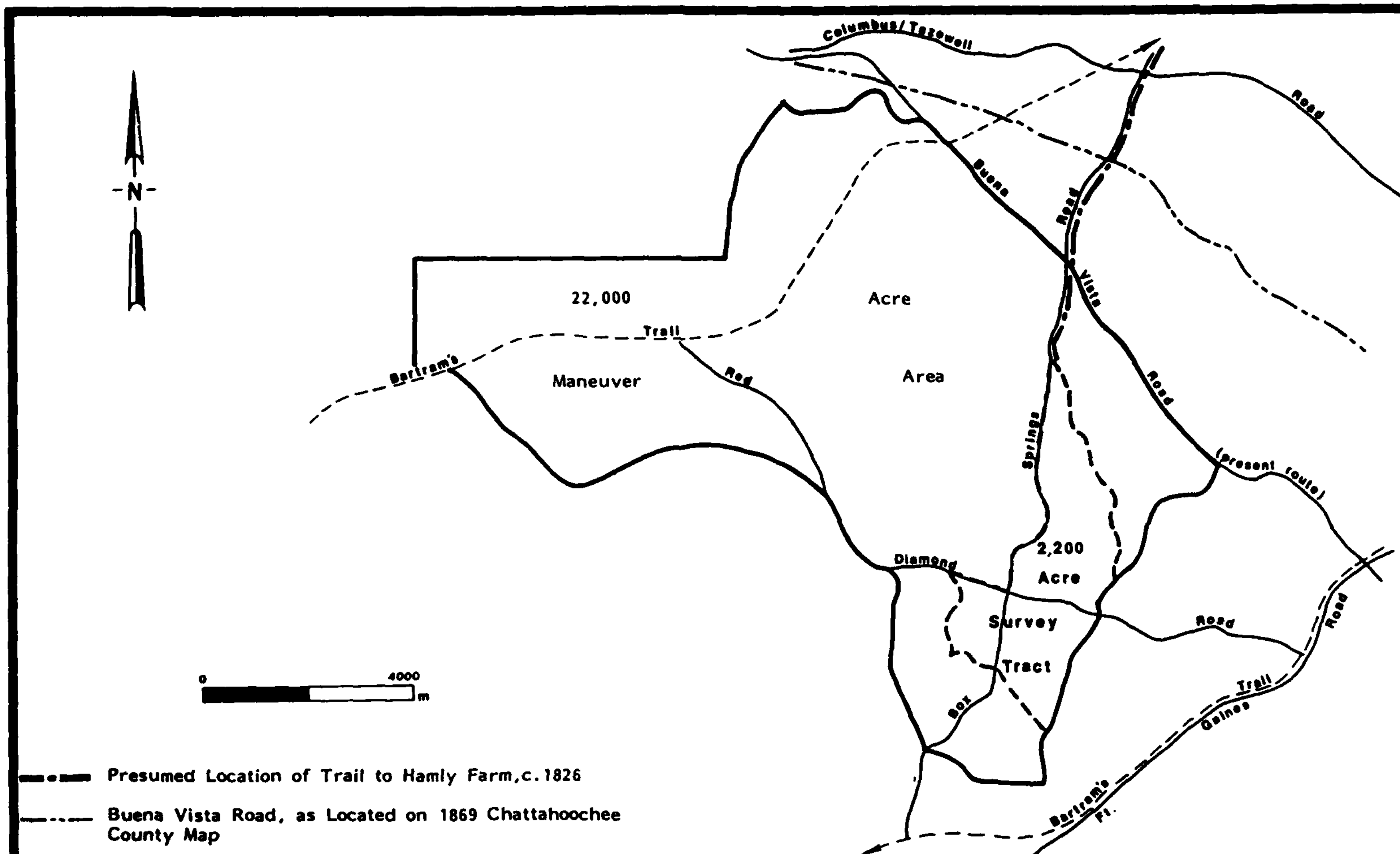

FIGURE 9. HISTORIC ROADS IN THE 22,000 AC PROPOSED MANEUVER AREA.

NWR

This path later became known as the Federal Road, and is marked as such on the 1869 Chattahoochee County map. The Federal Road had two branches: one that ran north of Upatoi Creek, and the other on the south side. The southern branch, also referred to as the 'Ecunhutene Path' (Kohler et al. 1980:25), is that portion of the Federal Road that was made famous by Bartram and is located within the proposed maneuver area. It roughly corresponds to the present First Division Road in the western portion of the maneuver area, and in the vicinity of Rowan Hill, the road veers to the northeast, intersecting with the present Buena Vista Road in the extreme northern portion of the maneuver area.

Bartram's Trail - Fort Gaines Road: When Bartram left the Chattahoochee Valley to return to the East, he traveled along what later became the old Federal Road. On his way into the Chattahoochee Valley, he followed a slightly more southern route in the vicinity of what is now Fort Benning. Much of the path he took in the southeast extreme of the military reservation later became known as the Fort Gaines Road. First indicated in the local records about 1817, this road connected Forts Perry (in Marion County, on the Federal Road) and Gaines (present county seat of Clay County, Georgia) (John Metcalf, personal communication). The Fort Gaines Road does not impinge on any part of the 22,000 ac maneuver area, but is within the vicinity to the south and east. This road, however, was much used and was one of the most prominent in the area, appearing clearly on both the original survey map of 1826 and the 1869 Chattahoochee County map.

Buena Vista Road: The present road between Columbus and Buena Vista, the seat of Marion County, is located along the northeast spine of the 22,000 ac maneuver area. It is indicated in that position on both the 1944 Fort Benning map and the 1928 county soil map. In earlier times, however, the main road between Columbus and Buena Vista was in a somewhat different location. One such route, identified by John Metcalf as the Columbus/Tazewell Road, was approximately three miles northeast of the present road. It was in use until approximately 1850, when Buena Vista, rather than Tazewell was made the Marion County seat. The route indicated on the 1869 map of Chattahoochee County shows an intermediate route between the Columbus/Tazewell Road and the present route.

Red Diamond Road: This currently maintained road cuts through much of the proposed maneuver area (including the 2,200 ac survey tract), and intersects with the First Division Road (old Federal Road) in the northern part of the maneuver area. Originally called St. Mary's Road, when it was first established in the early 1800s, it was later referred to as Wire Road for the telegraph line established along the route in 1848 between Washington, D.C., and New Orleans (John Metcalf, personal communication). The road appears on the 1869 Chattahoochee County map, and connected the Glen Alta community with the Halloca community and eventually, with Columbus. Although not as early as the Fort Gaines Road, the present Red Diamond Road is much older than most others within the proposed maneuver area, and was

doubtless used by the region's inhabitants to travel to either Marion or Muscogee County.

Box Springs Road: This road, probably established in the mid- to late 1800s, appears on the 1928 county soil map. Although the latest U.S.G.S. map of the vicinity indicates that the Army has since eliminated two small jogs in the route, it has not been subjected to serious alteration.

Although Box Springs Road does not appear on any maps earlier than 1928, a road or a path appears on the 1826 survey map in the vicinity of what would later be part of Box Springs Road. This path or blazed trail led from the Hamly farmstead to the Federal Road. Since this route does not show up on the subsequent 1869 map, it must be assumed that this path or road was abandoned sometime after the initial survey of the area.

Examination of Historic Properties Immediately Outside the Maneuver Area

Three historic properties outside of the maneuver area will be discussed in this report, not only because of their proximity to the proposed maneuver area, but also for their importance to the history of the project area. The first of these properties was the Calfrey Stand (or Inn). The second of these properties, the Eelbeck Mill, was the largest and most impressive mill complex in probably all of Chattahoochee County. The third was the Henry King Plantation, probably the county's largest Antebellum establishment (Figure 6).

The Calfrey Stand, one of the earliest hostelries within the vicinity of the maneuver area, probably began service to long-distance travelers sometime during the beginning of the 19th century. Although not much is known about its subsequent history, it is recorded that Lafayette spent the night of March 30th at the Stand (also known as Moss' Trading Camp) during his 1825 journey to the Creek settlements on the Chattahoochee River (John Metcalf, personal communication; Nolan 1934:280).

The Eelbeck Mill complex is located just north of the 22,000 ac maneuver area, about 500 m upstream of the mouth of Pine Knot Creek. The mill complex was probably built by James C. Sullivan on a 60 ac tract starting in 1832. Initially, a saw mill was constructed, after which a grist mill and possibly other associated buildings were erected. The structures, constructed of long-leaf pine and weather boarding, were built using slave labor, and were held together with morticing and pegging. Nails were used only for the sides and shingles (Hendricks n.d.).

The oldest surviving deed concerning the Eelbeck Mill dates to 1836. At that time, Sullivan sold his 60 ac tract in Lot 241 of the 9th District to a prospective operator. The mill changed hands

several times after the sale, until bought by Henry J. Eelbeck and James M. Cook in 1850. Together, these two men ran the mill until 1876.

James Cook, father of James M. Cook and acknowledged family patriarch, had been in the area since at least the 1840s, at which time he owned much of the land within the 22,000 ac maneuver area. His wife or consort (as she is identified on her gravestone), Amelia O'Quinn, was a daughter of the Revolutionary War veteran, John O'Quinn (John Metcalf, personal communication). Cook and his family lived either in or very near to the 2,200 ac survey tract, since the family cemetery is located in the northern extreme of the tract, just south of Sally Branch. Henry Eelbeck, the man for whom the mill complex came to be known, married Cook's daughter (John Metcalf, personal communication).

Eelbeck Mill was acquired by the Federal Government sometime prior to 1920, when its last private owner, C.R. Mehaffey, sold his holdings to facilitate an extension of the Fort Benning Military Reservation (cf. Table of Fort Benning Properties, Fort Benning Post Engineer Office, September 13, 1951). Although the mill was still standing as late as the 1930s, it is now ruined.

The Henry King plantation, just southwest of the proposed maneuver area on Buffalo Road, was the largest such construction within the proposed maneuver area or its vicinity. Although totally ruined today, the plantation and all of its satellite structures have been described in detail in an account of early Chattahoochee County history (Rogers 1933:36-40).

Henry King, who moved into the area as early as 1836 (Rogers 1933:106), established his plantation on a lot in District 6. Contrary to the assumption made by one researcher (Kohler et al. 1980:30), Henry King was not apparently related to John King, recipient of an 1825 land grant of Lot 42, District 5 (John Metcalf, personal communication).

By 1854, the King Plantation had increased to 2,900 ac, and the land was worked by 35 slaves (Kohler et al. 1980:30). The land remained in the King family until 1918, when Gary Wood King sold the property to the Federal Government.

Historic Properties Within the 2,200 Ac Survey Tract

Even though there are no recorded historic properties listed in the state site files within the 2,200 ac survey tract, there are two known cemeteries and a number of other historic properties that have been identified as the result of examining other research sources, such as historic maps, and knowledgeable informants. These historic properties are plotted on Figure 10 and discussed below.

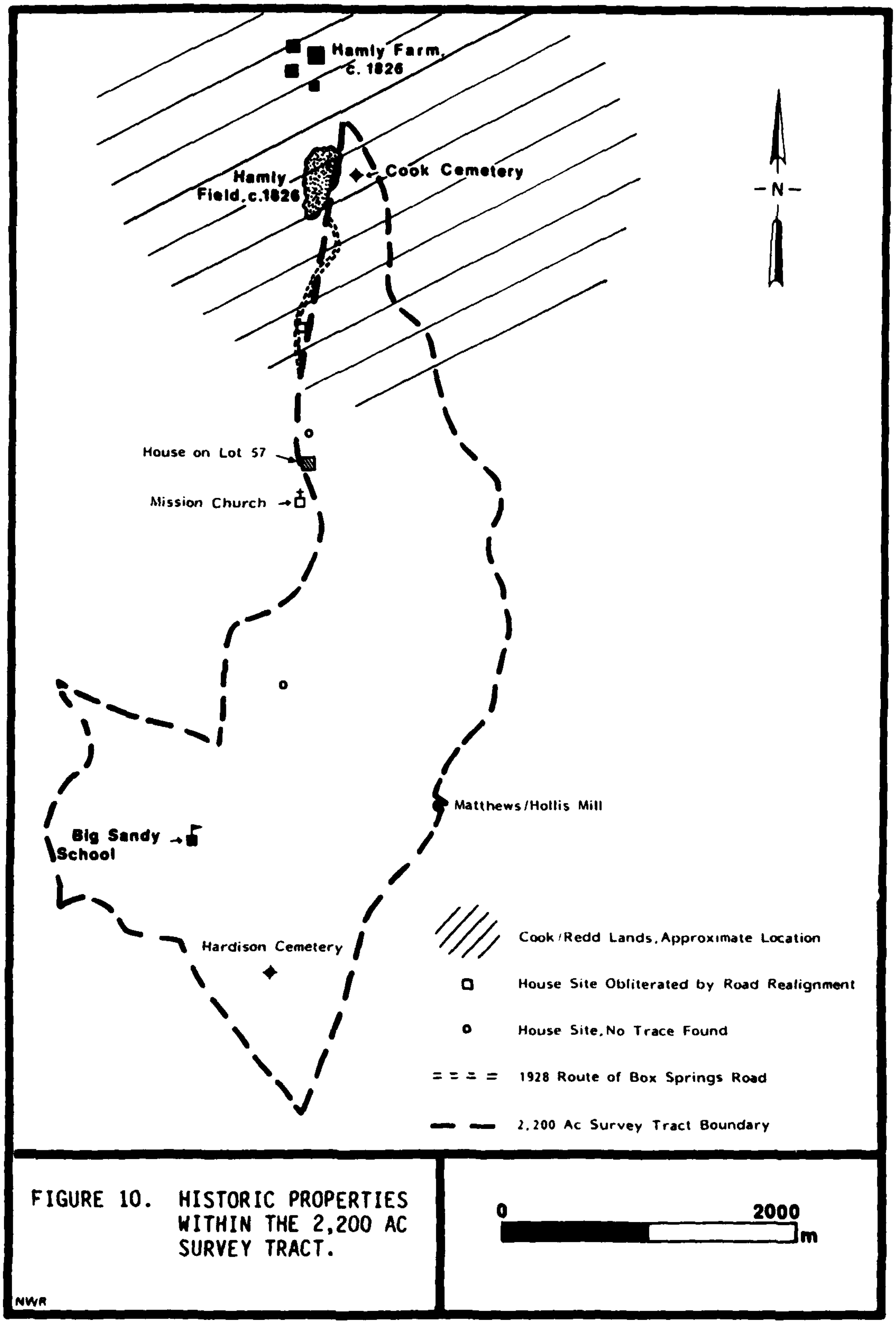

FIGURE 10. HISTORIC PROPERTIES WITHIN THE 2,200 AC SURVEY TRACT.

Cemeteries

The Cook Cemetery: The Cook Cemetery, or Cemetery #52 according to Fort Benning nomenclature, is situated near the northern extreme of the survey tract in Lot 60, District 5. This was the Cook family plot, and as such was discussed briefly in connection with the Eelbeck Mill (see above). The cemetery contains five graves. The biographical data on each of the tombstones are as follows:

James Cook, age 76, died 1866
Amelia, consort, age 55, died 1852
John Franklin Cook, age 20, died 1852 (son of James Cook)
James M. Cook, age 63, died 1891 (son of James Cook)
Stonewall Cook, age 1, died 1869 (son of James M. Cook)
(Hight 1977)

The Hardison Cemetery: The Hardison Cemetery, or Cemetery #49, is located on the Cantigny Trail in the southern part of the survey tract on Lot 44 of District 5. The plot contains 15 graves, only two of which are marked. Because of the prevalence of unmarked graves, it is possible that Hardison cemetery was utilized by the local black community, although no confirmation was obtained from local informants or other documentary evidence. The inscriptions on the two marked grave stones are listed below:

Jessie Hardison, age 50, died 1912
Charles King, age 61, died 1899
(Hight 1977).

House Sites

The remaining historical properties within the 2,200 ac survey tract were discovered after an examination of local historic maps and discussions with John Metcalf. These properties include the Cook holdings, the Matthews/Hollis Mill, the Big Sandy School and other properties not identifiable by name, but whose locations have been plotted on Figure 10.

Cook Lands: Due to the presence of the Cook Cemetery within the 2,200 ac survey area, it is possible, if not likely, that the Cook homestead is located within the survey tract as well. The general vicinity of the upper reaches of Sally Branch has certainly been exploited from earliest historic times in the area. Hamly, of mixed Creek and white parentage, had his farm buildings on the north bank of Sally Branch, while his cultivated field appears on the 1826 survey map on the south side, or within the survey tract. Although the area was then abandoned, perhaps when Hamley moved along with other Creeks to the west side of the Chattahoochee in the 1830s, it was shortly reoccupied by Alexander Ligon, who came into possession of Lots 59 and 60, or the area previously occupied by Hamly. At Ligon's death, his widow sold the property to James Cook, who very quickly established extensive holdings in the area.

About 1844, Albert Redd, a Columbus area merchant, purchased 2,600 ac of the Cook property on Sally Branch including Lots 59 and 60 (John Metcalf, personal communication). Whether or not Redd lived within the survey tract could not be ascertained.

The history of the Cook/Redd property was not be traced continuously from the early and middle 19th century to the present time. However, it is known from an early 1940s Fort Benning Tract Acquisition Register, that Lots 59 and 60, encompassing the Cook Cemetery and the surrounding area, and comprising a part of what is known according to Fort Benning land acquisition records as Tract 348, were sold to the Federal Government by a H.V.R. Turner.

Matthews/Hollis Mill: Although the 1826 survey map illustrates no structures or habitation sites along Hollis Creek, the 1869 map of Chattahoochee County indicates the presence of Matthew's Mill in the vicinity of what is now Schley Pond. Four years earlier, John L. Matthew had purchased 80 ac of Hollis Creek bottomland from Moses T. Hollis, and it was between 1865 and 1869 that the mill and mill pond were constructed. By the end of the century, Matthew had divested himself of the mill and property, which was later acquired by R.H. Hollis (John Metcalf, personal communication). The Hollis Mill is shown in roughly the same location on the 1939 county map displayed in the Cusseta court house; also depicted is an unnamed mill pond. On the 1944 Fort Benning map, the mill is identified by the name of Hollis, and the mill pond is now identified as Schley Pond. The Schley family, originally living around Cusseta, moved into the vicinity of the survey tract in the 1920s (John Metcalf, personal communication).

Lot 74, on which Hollis Mill is located, was purchased by the U.S. Government in the early 1940s. The lot was split between two tracts, the larger of which (Tract 316) was owned by Fred K. Schley; the much smaller tract (Tract 358) located in the eastern portion of the lot, was owned by Perry King.

Big Sandy School: This school house is depicted on both the 1928 county soil map and the 1944 Fort Benning map, and is located about 700 m south of the intersection of Box Springs and Red Diamond Roads. The earlier map indicates the school on the east side of Box Springs, while the 1944 map depicts it on the west. In the 1944 map, the school is designated as a Black institution, and this has been corroborated by John Metcalf (personal communication).

House on Lot 57: The 1939 map of Chattahoochee County indicates a 'C House' (County House, perhaps a school) immediately east of Box Springs Road on Lot 57. Although the house is not depicted on the subsequent 1944 Fort Benning map, the location of the house site is indicated on the Fort Benning Tract Acquisition Register. Prior to the Federal purchase, most of Lot 57 belonged to Joel Thornton, but in the northwest corner of the lot was a small tract (Tract 408) that at the time of the Federal Government acquisition, belonged to the Chattahoochee County Commissioners.

King Family Holdings: According to John Metcalf, a Black family with the surname King moved into the survey tract area just west of Schley Road starting in 1910.

The area immediately west of Schley Pond was probably first occupied by James Whittle in the second half of the 19th century. In 1891, Whittle sold land in Lots 41-43, and 54-56 to J.W. Bush. The land remained with the Bush family until 1910, when Loula B. Bush sold land in Lots 41, 55 and 56 to Oscar King. Perry King, presumably a relative, bought land east of Schley Pond in the same year. In 1913, George King, son of Oscar, bought additional property west of the pond (John Metcalf, personal communication).

Roads

Although the major historical roads within the 2,200 ac project area have been identified previously, some discussion of the roads within the 2,200 ac survey tract is warranted in order to understand the location of most historic properties found within that area.

Red Diamond Road, and its historical significance, have been discussed and a recapitulation of all the details is not in order. However, it should be mentioned that Red Diamond is the oldest known road within the survey tract, and is shown in all known local maps, starting with the 1869 Chattahoochee County map.

Box Springs Road, the only other named road within the bounds of the survey tract, is apparently later in date. Unlike Red Diamond Road, it was not a major county artery, and does not appear on local maps until the 1928 county soil map (although it must be presumed to have been in existence since the 19th century). The 1928 soil map shows three structures within the project area on the east side of the road near the crest between Sally Branch and Red Diamond Road.

Summary

Aside from the roads, the five house sites mentioned above and the two cemeteries are the only historic properties within the 2,200 ac survey tract than can be identified by name. Numerous historic sites within the survey tract are indicated on the 1928 Chattahoochee County soil map, but these have not been identified.

CHAPTER FOUR

RESEARCH DESIGN

The principal research goal of this project was the evaluation of cultural resource potential within the 22,000 ac maneuver area. In doing so, we were also asked to evaluate RSA's (Kohler et al. 1980) model of site location.

RSA's survey focused on Halloca Creek drainage over an area that comprises two percent of the reservation in addition to four smaller areas. RSA used the data from their survey, specifically the two percent, to develop a predictive model of site location. We anticipated that their model would have applicability to the proposed survey since the headwaters of Halloca Creek are immediately adjacent to the project area; moreover, Halloca Creek is small and very similar to Sally Branch and Hollis Creek which flow through the area NWR surveyed. In order to assess the potential applicability, a review and evaluation of their model formulation was made prior to our initiating fieldwork.

RSA examined six variables they considered to be influential in site location: 1) vegetation; 2) soil; 3) water; 4) slope; 5) relative elevation; 6) distance to roads. In developing the model, the first variable, vegetation, was omitted early in the survey since they felt that recent man-induced alterations had modified the original vegetational community, thereby reducing the importance of that variable.

Soils, however, were viewed as "a fundamental environmental feature" (Kohler et al. 1980:59). Although new soil maps were not available to RSA at the time of their survey, they utilized the older map editions with nomenclature revisions provided by the SCS. For

manageability, they lumped all soils of the same type, a practice that is frequently used by archaeologists when employing soils data for predictive modeling (cf. Thomas et al. 1981). Six soil types were identified within the survey area, representing the majority of those found on the reservation except for areas near the Chattahoochee.

In order to evaluate the importance of soils in site location, the total acreage covered by each soil type was computed. A chi-square test was performed to compare site frequency with acreage and the test results showed there to be a non-random distribution of sites in relation to soil type. One problem they recognized and sought to deal with was their low N; six cells in the chi-square test were empty. RSA undertook a series of additional steps to adjust for the effect of the low site frequencies, but these need not be reiterated here since their results are reasonably sound. They summarized the soil evaluation by stating:

> Considering the results of both approaches [soils and dealing with low N] simultaneously, we can say that there is a significant departure from non-random location of sites in relation to soil types. This can be accounted for preeminently by selection of Norfolk Sandy Loam and avoidance of Susquehanna Clay.
> (Kohler et al. 1980:63)

Under soils they also attempted to deal with agricultural potential, and found that for post-Archaic occupations soil productivity classes (Knobel et al. 1928 as cited in Kohler et al. 1980:76) and site location were marginally significant (Kohler et al. 1980:65). The authors pointed out, and justifiably so, that the soils themselves were not selected or avoided. Rather, it is the characteristics of these soils that determined whether settlement was attracted or shunned. We will return to this point later in the discussion.

For the third variable, water, RSA tested three factors: 1) distance to nearest water; 2) distance to next-nearest water; and 3) stream rank. In order to test whether distance to nearest water was a critical variable in site selection, the site data were compared to a set of computer-generated points which were randomly located throughout the drainage. They found that the aboriginal sites were further from water than a randomly generated set of points. Although the significance of this variable is not especially great, RSA did include it in their model. Viewed in terms of discrete site data, the mean distance to closest water for the aboriginal sites was about 150 m (.15 km) with a standard deviation of about 70 m. Since about two-thirds of the sites will be located within one standard deviation, most would be expected between about 75 m and 225 m from a stream.

The next factor tested for water was distance to next nearest stream. Without belaboring this further, it is sufficient to say that it was tested and found to be insignificant.

Finally, water as a predictive variable was examined in terms of rank (Strahler 1972). Again, site distribution was tested against random locations. RSA found that most of the sites were located on rank 1 streams; however, rank 3, 4, and 5 streams revealed relatively more sites than RSA expected or is commonly found in such studies. For example, in a sample survey of the Fort Gordon Military Reservation, Georgia, NWR (Campbell et al. 1981) found the majority of sites to occur on rank 1 streams, but sites were very poorly represented on the higher rank streams. The relative higher number of sites observed as opposed to expected frequencies on rank 3, 4, and 5 streams at Fort Benning was, therefore, surprising and may relate to factors yet to be fully explored or understood.

The fourth variable considered was slope. Although RSA notes that no sites were found on slopes greater than ten percent, their report does not specify the procedure used for determining slope.

The fifth variable was relative elevation, which was a rather complex variable to measure. RSA did not incorporate relative elevation into their model since they found it to be only marginally significant (Kohler et al. 1980:70). The final variable, distance to roads, is obviously specifically directed toward historic sites. In measuring the importance of this variable 1928 soil maps were used in addition to recent maps.

After reviewing, with differing intensity and depth, each of the six variables, RSA began an elimination process since many of the variables appear to be intercorrelated. Eliminated were: v-1 vegetation, which was dropped at the outset; v-3(b) distance to next nearest water source and v-3(c) type of nearest water; v-5 relative elevation; and v-6 distance to roads. (The following model formally developed relates only to aboriginal sites.)

The variables retained as having the greatest predictive potential were v-2 soil, v-4 slope, and v-3(a) distance to nearest water source. Seven soil types were selected as being favorable for settlement, slope was important since no sites occurred on slopes greater than ten percent, and distance to nearest water revealed maximum probability to be between 75 m and 225 m and minimum probability to be less than 75 m and greater than 225 m (the derivation of these figures was described above). Three variables with two states each, one favorable (+) and one unfavorable (-) for site location were thus isolated. RSA distinguished three of the four possible combinations, lumping together the two combinations of one positive, two negative, and three negative. These probability ratings may be outlined as follows:

3+ = favorable or high probability
2+ = intermediate or medium probability
1+ or 0+ = unfavorable or low probability

Thus, high probability areas include only one of the eight possible combinations of variables and are defined as only those areas encompassed by one of the favorable soils, such as Norfolk Sand, where the slope is less than ten percent and in areas between 75 m and 225 m from water. Low probability areas encompass four of the eight possible variable combinations. Three of these are marked by slopes greater than ten percent.

The results of their model formulation revealed high probability areas to comprise 270 ac, on which 11 sites were located or a ratio of one site per 25 ac. Medium probability areas comprise 780 ac and contain nine sites. This represents a ratio of one site per 85 ac. Finally, low probability areas include 2,950 ac in which four sites were found. This translates to a ratio of one site per 750 ac.

Using the RSA maps provided with the scope of work, we used a compensating polar planimeter to calculate the acreage of high, medium, and low probability areas within the proposed project area. The results are listed below in Table 4.

TABLE 4. PROJECT SITE FREQUENCIES BASED ON RSA MODEL

Probability	Percent	Acres	Expected No. Sites
High	13.3%	293	12
Medium	25.5%	560	6
Low	61.2%	1347	2
			Expected Total=20

The results of this procedure suggested a total of 20 prehistoric sites would be located in the area to be surveyed if the RSA model is applicable.

The above model applies to prehistoric site location only. No formal model of historic site location was offered; however, several suggestions were made and these were taken into consideration in our work. First, historic sites seemed to show a selection for soils with agricultural potential, especially Susquehanna Sandy Loam and Norfolk Sand. Second, historic sites showed a trend to somewhat greater variability in distance from water, and a preference towards larger streams. Third, historic sites tend to be located at higher relative elevations than prehistoric sites. Finally, as would be expected, historic sites are located close to roads.

In sum, our preliminary assessment of RSA's model was favorable and the detail provided in their report made the model replicable. Given the proximity and similarity of our study area to Halloca Creek, we believed the RSA model would be applicable and expected site frequencies would reflect observed site frequencies within the relative probability areas.

We felt, however, that we might be able to offer some refinement in the variables by tightening some of the definitions. As RSA notes, it is not the soils themselves that were selected or shunned by prehistoric peoples, but rather their characteristics which attracted or dissuaded settlement. This acknowledgement is critical to model development. Many of the variables RSA used are not independent of one another but are related in complex ways. For instance, soil type definitions often include such characteristics as slope, drainage, and permeability, which have a directed influence on an area's potential for agriculture and vegetation.

Consequently, by using soil type as the principal variable, most are either made redundant or of much less importance for predicting site location. Obviously, this can obscure facets of the model. For example, Norfolk Sandy Loam may be high probability because it is never on slopes greater than ten percent. Or, conversely, another soil type may end up being low probability because it is always on slopes greater than 30 percent. It would be advantageous to take a closer look at the soil characteristics in refining the model so that those points can be brought out if possible. This attempt at refinement was not a criticism of RSA's model. Indeed, NWR has failed to be able to make such finer distinctions ourselves in previous work. Since we, as Kohler et al. (1980), have observed this potential overlap, we were simply interested in exploring the possibility during model evaluation.

Another possible area for refinement would be in clarifying the variable combinations not only available "on-site," but within a reasonable radius of the site as well. For example, at Fort Gordon (Campbell et al. 1981) NWR found a trend for some of the Archaic sites to be situated nearest a rank 1 stream, but at a location in close proximity to where it flowed into a higher rank 4 or 5 stream. Therefore, it is critical to examine those environmental variables that both characterize the site and general site area.

RSA did take this fact into consideration in measuring such variables as mean distance to closest water source and next closest water source, but we wanted to take this approach in a slightly different direction by measuring variables within a specified catchment area that was equal for each site.

Finally, an understanding of "where sites are not located" was approached by RSA in their statistical demonstration of non random distribution of sites. Another approach is to actually gather specific data on non site locations and, using statistical analyses, discriminate between the environmental characteristics of these settings versus site locations.

In addition to evaluating site distribution (and ergo, undertaking predictive modelling), we also were interested in questions of chronology, inter-site variation, and temporal change in settlement. Specifically, once the model was finalized, we wanted to assess if

site location reflected differences either on a temporal, functional, or cultural basis.

Having conducted a number of past sampling surveys (Campbell et al. 1981; Thomas et al. 1981; Thomas et al. 1982), however, we were also very much aware of the potential limits on data recovered from this level of investigation. Diagnostic artifacts are recovered in usually very low frequencies and the majority of prehistoric sites are more often than not characterized by lithic scatters.

The problems inherent in posing cultural questions and in their resolution are further amplified on military reservations, where significant impact from military activities has occurred, more often than not to the complete detriment of the cultural resources. This is especially true of the historic resources, where the military policy of building removal effectively eradicates surficial evidence of historic activities.

With these problems in mind, therefore, the cultural hypotheses, or more accurately cultural questions, which can be addressed from data recovered from military reservation surveys must be carefully structured in order to take full advantage of previous research both on the reservation and within the area. Also, in the case of questions relating to the historic period, consideration must be given to data documenting the pre-military reservation patterns of settlement and land-use.

Prehistoric Issues

The data available for occupations during the prehistoric periods identified at Fort Benning, and within the surrounding area, suggest that in interior locations, away from the immediate Chattahoochee River drainage floodplain, only limited utilization of the areas would be expected prior to the later Woodland and general Mississippian periods. Obviously, this generates the initial questions concerning the prehistoric occupations both within the 2,200 ac sample area and the larger, 22,000 ac maneuver area.

1. Available data suggests that no Paleo-Indian, Early or Middle Archaic occupations would be identified within the 2,200 ac sample area or the 22,000 ac maneuver area.

Though DeJarnette et al. (1975) suggest that Paleo-Indian utilization of the Chattahoochee uplands is possible, based on the McCann collection data (see Chapter Two), there is insufficient data to suggest that any Paleo-Indian occupation will be identified within the 2,200 ac sample area. Further, the sparse data available on the Early and Middle Archaic occupations of the region suggest that utilization of the region during those periods focused on the alluvial bottomlands and the margins of the river valley, at the interface between the floodplain and the uplands. Huscher (1964a) and Chase (*n.d.c.*) do, however, suggest that Early and Middle Archaic occupations may also be

present along the principal secondary streams of the Chattahoochee. Though Halloca Creek, adjacent to the project area, has a substantial floodplain, it is a rank 3 or 4 stream, feeding into the Ochillee, which in turn feeds into the Upatoi. On the basis of these data, we would suggest that little if any Paleo-Indian, Early or Middle Archaic utilization of the 2,200 ac sample area or the 22,000 ac maneuver area would be expected.

2. Increased utilization of the uplands is suggested during the Late Archaic, Early and Middle Woodland. However, the most intensive occupations appear to date to the Late Woodland and Mississippian. Therefore, the majority of sites encountered, if assignable to a chronological period, should date to the Woodland (late) or Mississippian periods.

Previous work (Chase n.d.b.) indicates that increased utilization of secondary stream and interior locations is seen in the Late Archaic period. Sites with both Late Archaic and Early Woodland components, in stratigraphic context, have been identified along Halloca Creek, directly on the floodplain, and toward the valley margins. There is little evidence, parenthetically, to indicate intensive utilization immediately along the Chattahoochee River, a departure from the usual ceramic Late Archaic settlement preference for major river settings. By the Middle Woodland, available information indicates that principal base camp/village locations are present along both secondary and tertiary streams. By the Late Woodland, and continuing through the Mississippian, sites are present in number throughout the uplands, though the major Mississippian villages appear to cluster immediately along the Chattahoochee River.

3. The settlement patterning suggested above would indicate that the majority of the sites encountered would be small to medium resource extraction locations, though village or base camp sites might be present immediately adjacent to a tertiary stream.

Chase (n.d.c., n.d.d., n.d.f., 1978a, 1978b) indicates that by the Middle Woodland the majority of the sites present in the uplands appear to be small seasonally-specific encampments. Whether these sites are focused on agricultural production or natural resource exploitation is unclear, though it is apparent from features present at excavated sites and artifact assemblages that food storage and processing was being conducted. Obversely, larger sites, which Chase (1978b) suggests might be base camp/village locations tend to occur immediately adjacent to the streams (including Halloca and Upatoi Creeks).

Historic Issues

Questions concerning the historic utilization of the project areas are more straight forward, and obviously less subject to conjecture. First, there is little evidence to suggest that any occupations dating to the contact (ethnohistoric), Spanish or British colonial periods

would be expected in the project area. During the early historic period, the concentration of aboriginal villages was immediately along the Chattahoochee River. Though undoubtedly hunting and collecting forays were conducted by these peoples in the upland areas, unless diagnostics are recovered there would be little way to differentiate these sites from those of earlier periods. With regard to the Spanish and British periods, the territory encompassed by the project areas was in Creek hands for the duration of both. Though trading posts were established, there is no evidence to suggest that intensive Euro-American utilization of the region occurred.

Based on available historic documentation, we would suggest that the majority of historic sites encountered during the survey would be house sites, probably utilized by yeoman farmers, and that these sites probably will date to the post-bellum period. Though settlement of the region during the Antebellum period definitely occurred, the household sites and settlements tended to be more dispersed. Several large acreage landholdings are known to have been present in the area, further decreasing the number of individual units one would expect to find. The concentration of large plantations was immediately along the Chattahoochee River and major secondary streams.

Further, unlike other regions of the Southeast, there is little evidence to suggest that intensive lumbering or turpentine industries, dated to the Antebellum and post-bellum periods, should be expected in the project areas. Historic documentation does suggest that individual-owned saw mills were present in the region, however the data indicates that these mills were rather small-scale and oriented to the immediate needs of the local populace.

CHAPTER FIVE

INTENSIVE SURVEY

The intensive survey of 2,200 ac within Fort Benning was designed to evaluate the potential for cultural resources to be located within the 22,000 ac maneuver area and to test the applicability of RSA's model of prehistoric site location. An initial evaluation of their model (see Chapter Four, this volume) led us to suggest that 20 sites would be expected in the current project area if the Halloca Creek model was applicable to the remainder of the reservation.

To provide the most thorough approach to model testing, however, we added another dimension to the survey, the acquisition of data on where sites are not located. Thus, our field procedures included standard systematic survey and site recording techniques as well as systematic data recording on non-site points. Each procedure is outlined below, followed by a summary of results.

FIELD METHODS

Survey

The survey was conducted by a five person crew that covered the 2,200 ac in a skirmish-line fashion. Transects were oriented east/west and spaced at 30 m intervals. Although the interval between transects was maintained by regular compass recordings, the beginning and ending points on each transect were flagged to ensure proper control. Additional field control was achieved by numbering each transect consecutively from north to south (Figure 11).

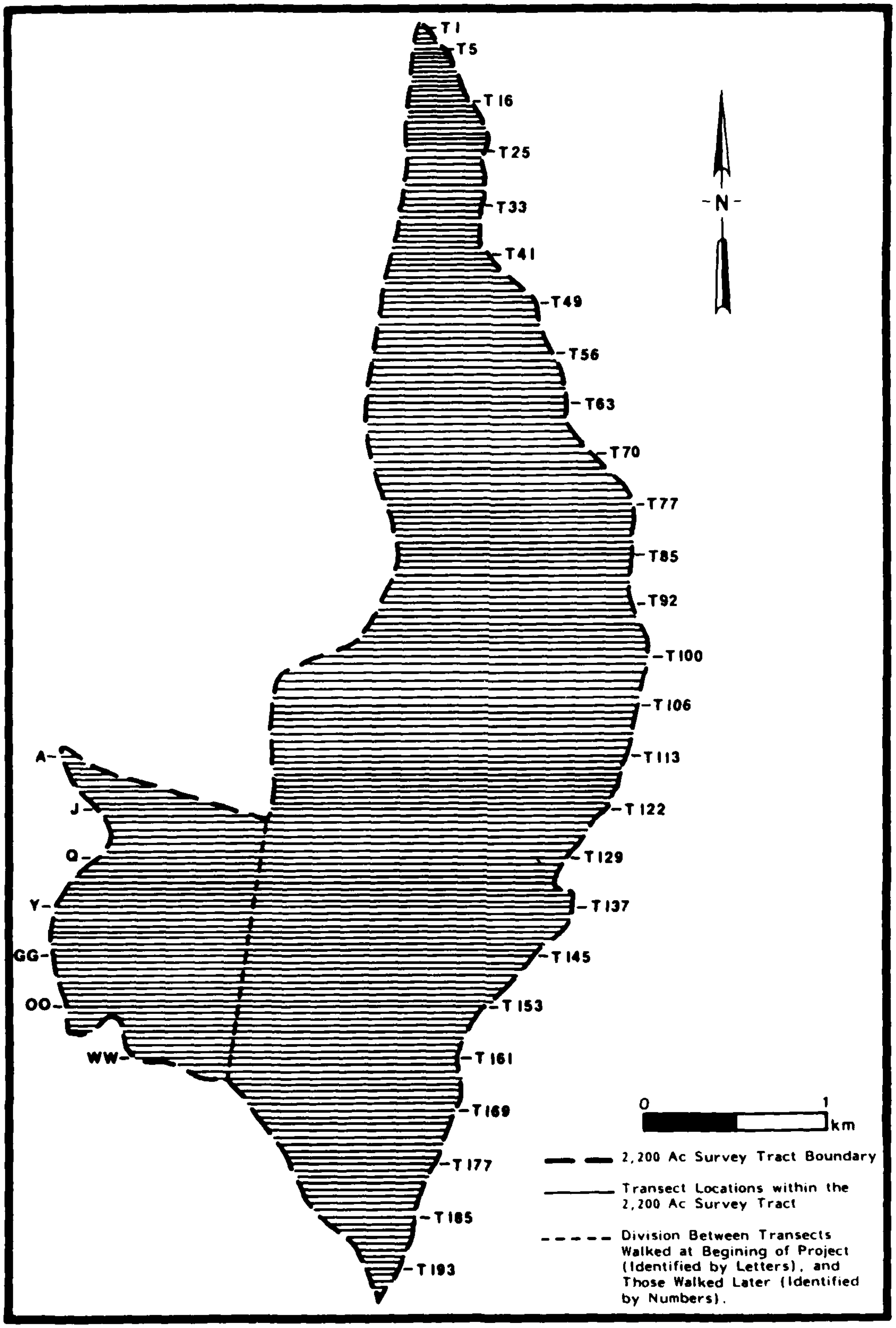

FIGURE 11. 2,200 AC SURVEY TRACT SHOWING LOCATION OF NWR TRANSECTS.

Inventory along each transect was standardized according to visibility. The majority of the survey tract afforded conditions suitable for continuous surface inspection. To achieve systematic surface examination, a 2 m by 2 m square was thoroughly inspected for artifacts every 30 m. In areas where the ground cover obscured visibility, shovel pits were substituted for the 2 m by 2 m collection units. On the average, shovel tests were 30 cm in diameter and reached a depth of 30 cm. The stratigraphy of each shovel pit was examined and representative profiles fully described using standard soils terminology and Munsell Color diagnostics. These profiles provided a general picture of stratigraphic continuity and variation throughout the 2,200 ac survey tract. All dirt from the shovel tests was sifted through 1/4 in (6.35 mm) hand screens to ensure artifact recovery. Upon completion, the shovel tests were backfilled.

In addition to the surface collection squares and shovel pits, the crew took advantage of any exposed area such as military trails, road cuts, erosional gullies, etc. All areas of exposure were inspected for stratigraphic information and to determine if artifacts were visible. When artifacts or indications of cultural activity (e.g., depressions, foundations, etc.) were encountered, a general reconnaissance was made of the area. A brief written description of the area was made and the find was both flagged and plotted on the appropriate U.S.G.S. quad map. A non-detailed sketch map was produced which, with the plotting and brief description, would facilitate relocation for formal recording.

Survey Records

Accurate recording of all aspects of the survey was maintained in a daily field log. In addition to keeping track of all transects, shovel pits and surface collection units, sites identified along the transect were noted and briefly described. General observations on environmental features, disturbance and any other pertinent data were also noted in the field log and a general photographic record was made as the survey progressed. Other types of documentation included site forms and variable coding forms which are discussed under site and non-site recording.

Site Recording

To standardize survey data, several working definitions of a site were employed throughout the project. They are as follows:

Prehistoric Sites

1. the presence of three or more artifacts
2. the presence of cultural strata
3. a combination of both 1 and 2

FIGURE 12. EXAMPLE OF BUNKERS ENCOUNTERED IN THE SAMPLE SURVEY TRACT.

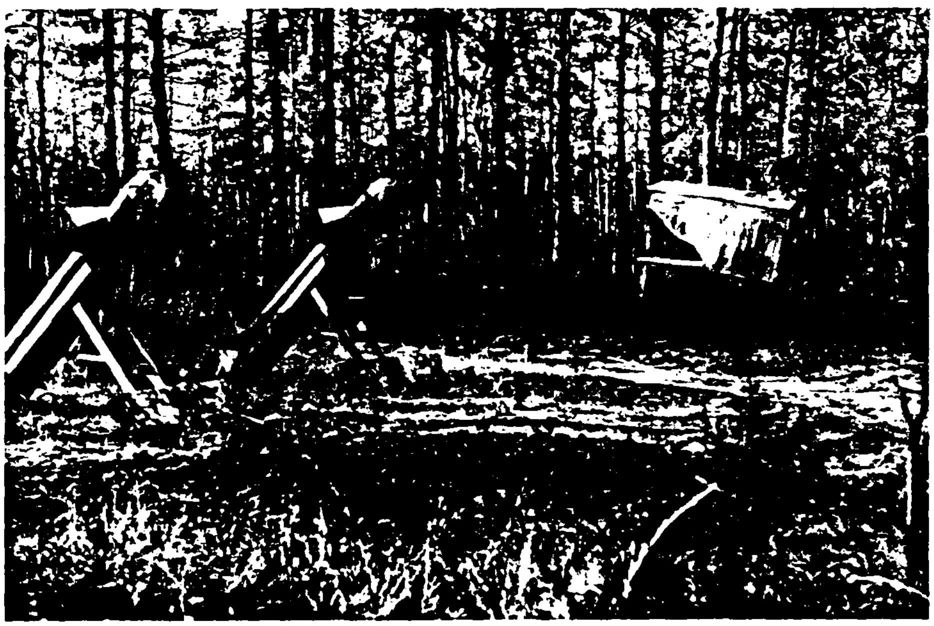

FIGURE 13. EXAMPLE OF SIMULATED MISSILE IMPLACEMENT ENCOUNTERED IN THE SAMPLE SURVEY TRACT.

Historic Sites

1. an historic artifact scatter
2. structural remains
3. standing structures
4. possible features such as wells or privies
5. transportation routes
6. any combination of the above categories

In all but one instance, prehistoric finds with less than three artifacts observed during the survey were considered isolated finds, marked on the U.S.G.S. map and collected. In one case, however, three flakes were found, located wholly within the boundaries of an historic site, 9Ce144. Because 9Ce144 was situated in plowed field, ensuring good surface exposure, and because no additional prehistoric materials were located across the surface of the site or in subsurface tests, the three flakes were assigned an isolated find designation (IF 34).

In the case of historic sites, several exceptions to the definitions must be noted. First, any road clearly associated with military activities was excluded. Transportation routes of importance were those older than 50 years and associated with historic developments in the region. Examples of other exceptions were historic artifact scatters of clearly recent origin (e.g., refuse or ordinance) and military-related constructions, such as bunkers (Figure 12), foxholes and simulated missile implacement (Figure 13). These occurrences were marked on U.S.G.S. topographic maps and a sample of non-explosive materials were collected. They were not, however, given field site numbers.

Field site numbers were assigned to all prehistoric and historic remains that met our criteria for site definition. It should be noted that there were two occasions where both prehistoric and historic materials were in close proximity to, or overlapped portions of, one another. To avoid confusion, each was given a separate temporary site number, in order to accurately account for the number of prehistoric and historic components defined during the course of the survey. Only one State of Georgia permanent site number was assigned, however, to the two components.

At each site, a formal recording procedure was undertaken. First, the site was given a temporary field number and a general reconnaissance was made. On the basis of the reconnaissance, a site center was approximated and four transects were walked in the cardinal directions from this center. Either surface collections were made or shovel pits were excavated at systematic five meter intervals along each transect. Recovery procedures and profile examination for shovel pits were identical to that described for the general survey procedure.

The horizontal limits of the site were defined by the cessation of artifacts or cultural deposits for three consecutive shovel tests or collection stations. Exceptions to this procedure occurred infre-

quently and only when a site was exceptionally large or irregularly shaped. In the case of the former, a series of radial transects were placed in different areas of high artifact density. In the case of the latter, linear transects were substituted for the radial alignment in order to accommodate the irregular site configuration.

Once defined, the site was thoroughly documented. Documentation included general notes on the environment, disturbance, site configuration and characteristics and a photographic record in both 35 mm black and white prints and color slides. A Georgia State Site Form was filled in for each site and the record of artifact recovery kept on a continuing bag list. One form of documentation requires more thorough discussion: this is the variable code form discussed below.

Prior to inaugurating the survey, a variable coding form was developed for use at Fort Benning. The form is a simply-organized vehicle for recording standard characteristics of each site and to record non-site point data. Presented as Figure 14, the form includes locational data, environmental features, site-specific characteristics, and general information. It was developed to provide compatible site data throughout the project, with its ultimate value expressed in the application of statistical tests to isolate those variables that were significant in site location. Since it was also employed to record data on non-site points, the performance of discriminant analysis enabled us to determine not only the variable combinations that influenced where sites were located, but also those that characterized where sites were not located.

Non-Site Point Recording

To select for non-site points, a hypothetical grid was overlaid onto the survey tract. The level of resolution for non-site points had to meet two criteria: 1) it had to be sufficiently tight to provide representative coverage; and 2) it had to be manageable within the time and cost considerations of the project. In consultation with ASB, a 15 ac level of resolution was chosen, thus each grid square comprised 15 ac. The intersection of grid lines was selected as the non-site point.

A total of 128 non-site points were recorded during the survey. Each was identified by their grid coordinates. East/west grid lines were identified (north to south) by letters, A-Y; north/south grid lines were identified (west to east) by numbers, 1-12. Thus, each non-site point was labeled alphanumerically by its east/west and north/south grid placement.

Summary

The procedures employed in this survey were deliberately standardized and rigorously followed in order to ensure thorough coverage

FIGURE 14. VARIABLE LIST FOR CODE SHEET
FORT BENNING SURVEY

Code	Explanation	Numeric subcode	Explanation
DEF	Definition	1	non-site
		2	site
LOC		1	Project area
		2	outside project area
EW	Location E/W	___ ___ ___ ___	
NS	Location N/S	___ ___ ___ ___	
STATUS		01	NWR site
		02	Previously reported and revisited in project area
		03	Previously reported and not revisited in project area
		04	Previously reported not visited-outside project area
		05	Previously reported visited--outside project area
TP#	Temporary Site #	___ ___ ___	Assigned in field
PERM#	Permanent Site #	___ ___ ___ ___ ___ ___	Assigned in field if previously reported Otherwise, assigned by State after survey
TR#	Transect #	___ ___ ___	From survey map
AR	01 ____________		Army administrative units (at Fort Polk, examples were Peason Ridge, Castor); use only if applicable; otherwise leave blank
	02 ____________		
	03 ____________		
	04 ____________		
	05 ____________		
	06 ____________		
	07 ____________		
	08 ____________		
	09 ____________		
	10 ____________		

FIGURE 14. (continued)

Code	Explanation	Numeric subcode	Explanation
ZN	__ __		Number assigned from Army base map; fill in double digit number
PY	Physiographic Drainage	0 1 __	Drainages present in survey area; use double digit numbers, and identify
TP	Topography	01	Bottomland knoll
		02	General floodplain
		03	Floodplain at the confluence of two streams
		04	First terrace (if not identifiable by quad contour interval)
		05	All other terraces above floodplain
		06	Ridge nose
		07	Ridge crest
		08	Saddle
		09	Ridge slope
		10	Contoured land
SL	Slope	01	0-10 percent
		02	11-25 percent
		03	26% or greater
DNNS	Distance to Nearest Stream		From Topographic map or field observations --enter in meters
SR	Stream Rank	1	Rank of above
		2	
		3	
		4	
		5	

FIGURE 14. (continued)

Code	Explanation	Numeric subcode	Explanation
ST	Type of Nearest Stream	01	Ephemeral
		02	Intermittent
		03	Perennial
DNNW	Distance to Nearest Water Other than Streams	99	Not applicable-nearest water is stream
		01	spring
		02	natural lake
		03	well
SO	Soil Type	— —	From soil manual; use code and give definition
		— —	
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ELEVA	Elevation in feet	— — — — —	From topo map--use all five digits (e.g., 00310)
ELEVM	Elevation in meters	— — — — —	Convert in Lab

FIGURE 14. (continued)

Code	Explanation	Numeric subcode	Explanation
DN	Nature of disturbance	1	plowing
		2	slope wash
		3	heavy equipment
		4	erosion
DP	Percentage of disturbance	1	0-10 %
		2	11-25 %
		3	26-50 %
		4	51-75 %
		5	greater 75 %
		6	unknown
OP	Ornamental Plants	1	yes
		2	no
CP	Collection procedures	1	shovel pits
		2	surface collection
		3	shovel pits and surface collection
		4	general collection
		5	shovel, surface, and general
		6	no collection made
AC	Additional collections	1	specify
		2	
		3	
		4	
CU	Number of collection units	_ _	fill in-two digits
SP	Number of shovel pits	_ _	fill in-two digits
SS	Site Size	_ _ _ _ _	length in meters
		_ _ _ _ _	width in meters

and comparable data. Although standardization in field methods is always important, the application of statistical tests required that the procedures be as strictly adhered to as possible and any deviation carefully noted.

As an added check on our coverage, we implemented an informal evaluation of the adequacy of a 30 m interval to locate at least 90 to 95 percent of the sites. It was necessary on many occasions to walk to the beginning point of a transect. Gaining access was regarded as providing informal random transects so the ground was inspected in a like manner to the systematic transects. In none of these access transects did we encounter a site that would not have been found by the 30 m interval. Thus, although we have no statistical measure to confirm our survey accuracy, we feel confident that sites have not been missed. Figure 15 illustrates those areas of extra coverage inspected by movement to and from the transects. Although not a formal series of random transects, the coverage is rather extensive.

RESULTS

Using the survey techniques outlined above, a total of 69 cultural occurrences were located. Of these, 32 are isolated finds, 20 are prehistoric sites, 15 are historic sites, and two are prehistoric/historic sites. Two of the prehistoric sites were previously recorded and relocated during our survey, 9Ce51 and 9Ce93. The prehistoric sites can be divided into two broad types, lithic scatters and lithic/ceramic scatters. The historic sites represented greater diversity, including evidence of domiciliary and industrial use. Table 5 lists all the sites and Table 6 lists isolated finds recorded during our survey. The general types of sites found are summarized below:

Prehistoric	Lithic Scatter	14
	Lithic and Ceramic Scatter	6*
Prehistoric/ Historic	Lithic, ceramic, and historic artifact scatter	2
Historic	Homestead	7
	Historic Artifact Scatter	5
	Mills	1
	Agricultural Dams	2
TOTAL		37

* The two previously recorded sites relocated during the survey, 9Ce51 and 9Ce93, are counted among the six sites in this category.

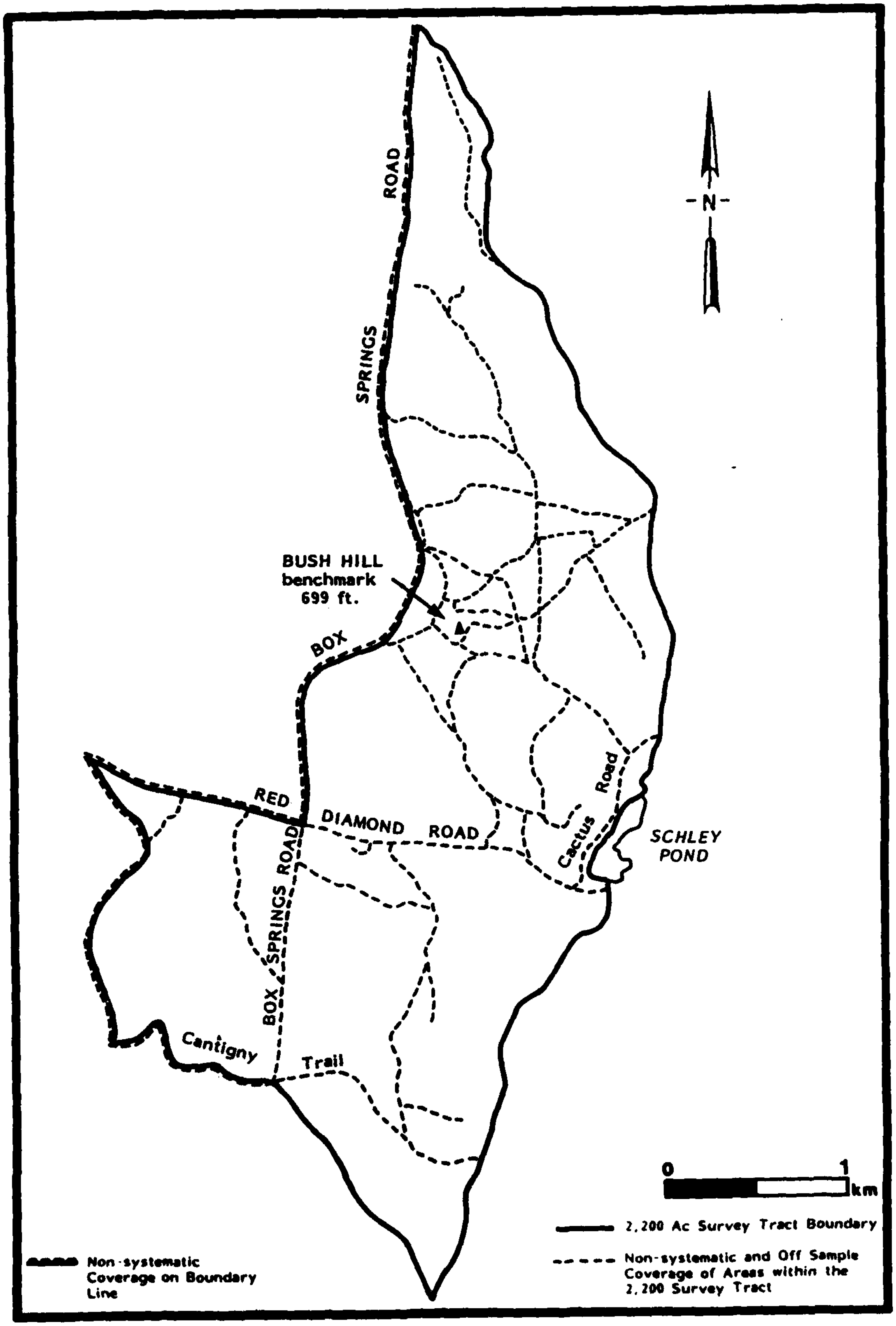

FIGURE 15. JUDGEMENTAL SURVEY TRANSECTS CONDUCTED IN 2,200 AC SURVEY TRACT.

TABLE 5. ARTIFACT SUMMARIES, CULTURAL OCCURRENCES

GA #	Lithics	Prehistoric Ceramics	Historic Ceramics	Glass	Metal	Misc.	Totals
9Ce51	130	33					163
9Ce93	46	13					59
9Ce134	8						8
9Ce135	54	1					55
9Ce136	7						7
9Ce137			16	16	4	2	38
9Ce138	36						36
9Ce139	4						4
9Ce140			20	44	1	1	66
9Ce141	3						3
9Ce142			7		2		9
9Ce143	3						3
9Ce144			33	17		1	51
9Ce145			30	14	1	1	46
9Ce146			2	3	3	1	9
9Ce147			21	7	4	2	34
9Ce148*							
9Ce149*							
9Ce150			9	1			10
9Ce151	13	1					14
9Ce152	11						11
9Ce153	19						19
9Ce154	4						4
9Ce155*							
9Ce156	7						7
9Ce157	24	1					25
9Ce158	4						4
9Ce159			4	16	1		21
9Ce160	45	2	15	13	4	3	82
9Ce161	5		40	13	6	5	69
9Ce162	26						26
9Ce163	10	1					11
9Ce164			6	1	6		13
9Ce165	9						9
9Ce166	16						16
I.F.[1]	21		8	3	4	1	37
TOTAL	505	52	211	148	36	17	969

[1] all isolated finds combined
* site without artifact assemblage
** NWR sites 4, 6, 9, 10, 13, 24, 33 were eliminated

TABLE 6. DESCRIPTION OF ISOLATED FINDS

I.F. # and Description	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total Artifacts
1 - chert, unmodified tertiary flake		1		1
(2 & 3 - eliminated)				
4 - chert, unmodified tertiary flake		2		2
5 - ironstone, undecorated sherd; brick fragment		2		2
(6 & 8 - eliminated)				
9 - chert projectile point[1]		1		1
10 - ironstone, undecorated sherd		1		1
11 - chert, unmodified tertiary flake			1	1
12 - ironstone, undecorated sherd		1		1
13 - chert projectile point[2]		1		1
14 - quartz projectile point fragment		1		1
15 - chert, unmodified tertiary flake		1		1
16 - glass, unidentified bottle body fragment, smooth surfaced, clear		1		1
17 - eliminated				
18 - glass, whole milk or cream bottles, automatic manufactured		2		2
19 - ironstone sherd, blue non-stippled transfer-printed		1		1
20 - chert, unmodified tertiary flake		1		1
21 - iron barbed wire strand		1		1
22 - iron barbed wire strand		1		1
23 - ironstone, undecorated sherd			1	1

TABLE 6. DESCRIPTION OF ISOLATED FINDS
(continued)

I.F. # and Description	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total Artifacts
24 - eliminated				
25 - iron barbed wire strand			1	1
26 - iron barbed wire strand		1		1
27 - chert, unmodified tertiary flake			1	1
28 - chert, modified tertiary flake		1		1
29 - chert, unmodified tertiary flake		1		1
30 - chert, unmodified tertiary flake		1		1
31 - ironstone, undecorated sherd			1	1
32 - ironstone, undecorated sherd		1		1
33 - chert biface fragment		1		1
34 - chert, unmodified tertiary flake	2		1	3
35 - chert, unifacial spokeshave	1			1
36 - ironstone, undecorated sherd	1			1
37 - chert, unmodified tertiary flake	1			1
38 - chert, unmodified tertiary flake		1		1
39 - chert projectile point[3]		1		1
TOTALS	5	26	6	37

[1] Stemmed triangular and shield-shaped, medium-size, broad; Archaic to early Woodland association (Wauchope 1966:125-7, Figure 64 and 65).

[2] Stemmed large blade; Late Archaic to Middle Woodland association (Wauchope 1966:160-1, Figure 95, c and k).

[3] Stemmed triangular and shield-shaped, medium-long, medium-wide; Archaic to Early Woodland association (Wauchope 1966:132-6, Figure 71, q and u).

Prehistoric Sites

As expected, the prehistoric sites were dominated by non-diagnostic lithic scatters. Each site and the artifact collection recovered has been thoroughly described in Appendix I. Briefly, however, only five diagnostic projectile points were found; three of these were isolated finds. Single occurrences of the point types Madison, Hamilton, and stemmed large blade were identified; two stemmed triangulars and shield-shaped points were also classified (Table 7). The latter two types date to the Late Archaic and Woodland, while the former are Mississippian. Only seven sites produced ceramics. With the exception of a single eroded check-stamped sherd (probably Deptford Check Stamped) from 9Ce93, all of the ceramics were plainwares (Table 8).

Though in our original proposal we had suggested that detailed analyses of the technological attributes of the various prehistoric artifact categories, specifically lithics and ceramics, would be conducted, the data recovered during the survey were insufficient. In the case of the lithics, the majority of the artifacts were secondary and tertiary unmodified quartz flakes. This information affords little in the way of specific data concerning the possible function of the sites. Their presence could possibly suggest that the final stages of tool manufacturing were conducted at the sites (Brookes 1979). The obvious lack of primary flakes and cores from these sites additionally suggests that the primary stages of tool manufacture were being conducted off-site.

These suggestions offer little in the way of data which can be extrapolated to larger research issues. NWR encountered a similar situation during its recent survey of the Fort Polk Military Reservation in western Louisiana (Thomas et al. 1982). The majority of the prehistoric sites encountered were small, lithic scatters without tools or diagnostic artifacts. In an effort to maximize the research potential of such information, a series of artificial constructs were designed to classify the lithic and lithic/ceramic scatters. The underlying assumption of classification was that arbitrary classes, their validity tested by previous research (New World Research 1981), might have possible functional implications (Thomas et al. 1982:1-30 - 1-31).

Therefore, six site classes, based on the number of items present in the collection of a site, the percentage of tools to flakes in the collection, or the presence of both lithics and ceramics were established for the Fort Benning sites. Site class I sites represent the largest case, and encompass all sites with from one to eight lithic artifacts (usually all flakes) in their collection. Site class II represents those sites which yielded nine to 25 items, but the collection had less than 15 percent tools. Obversely, site class III has the same number of items but over 15 percent of the collection are tools. Site class IV sites represent all sites with collections comprised of from 26 to 65 items, and site class V are all sites with greater than 65 items. Site class VI sites had both ceramics and lithics present.

TABLE 7. PROJECTILE POINTS RECOVERED DURING THE FORT BENNING SURVEY.

Site Number	Type Name	Description
9Ce51	Hamilton	Woodland/Mississippian; circa 500 - 1000 A.D. (Cambron and Hulse 1975:A-45)
9Ce135	Madison	Late Woodland/Mississippian (Cambron and Hulse 1975:A-60)
I.F.9	Projectile Point Fragment	Stemmed triangular & shield shaped, medium-size, broad (Wauchope 1966: Fig. 64 and 65; pp. 125-27) Archaic - Early Woodland
I.F.13	Projectile Point Fragment	Stemmed large blade (Wauchop 1966:Fig. 95k; pp. 160-161) Late Archaic - Middle Woodland
I.F.14	Projectile Point Fragment	Unidentified
I.F.39	Projectile Point Fragment	Stemmed triangular & shield-shaped, medium/large, medium wide (includes Savannah River, Stanley and possibly some Kirk Corner Notched); (Wauchope 1966:132-36, Fig. 71 q,u,); Archaic - Early Woodland

TABLE 8. PREHISTORIC CERAMICS RECOVERED DURING THE FORT BENNING SURVEY

Site Number	Description
9Ce51	6 plain body sherds (find sand) 26 plain body sherds (sand) 1 plain body sherd (grog and sand)
9Ce93	11 plain body sherds (sand) 1 plain body sherd (minimal sand inclusion) 1 decorated (check-stamped)
9Ce135	1 plain body sherd (sand with micaeous inclusions)
9Ce151	1 plain body sherd (sand)
9Ce157	1 plain body sherd (sand with grit)
9Ce160	2 plain body sherds (sand)
9Ce163	1 plain body sherd (sand)

The implications of the classifications, based on the TransAnadarko (New World Research 1981) and Fort Polk (Thomas et al. 1982) test cases are that site class I and II sites represent low density/minimal activity sites, while class III, IV, and V sites represent high density/intensive activity sites. Class VI sites were not considered as such either on TransAnadarko or at Fort Polk, because the incidence of ceramic bearing sites in relation to the total number of sites was quite low. At Fort Benning, however, 31.8 percent of the sites yielded ceramics; therefore, site class VI was created. The classes and sites within each are presented on Table 9.

TABLE 9. NWR PREHISTORIC SITE CLASSES AT FORT BENNING

Site Class	Site Number	Total # in Site Class	Percentage of total sites	Class if lithic only
I	9Ce136			
	9Ce139			
	9Ce141			
	9Ce143			
	9Ce156			
	9Ce158			
	9Ce161			
	9Ce165			
		8	36.4	n/a
II	9Ce134			
	9Ce166			
		2	9.0	n/a
III	9Ce152			
	9Ce153			
	9Ce154			
		3	13.6	n/a
IV	9Ce138			
	9Ce162			
		2	9.0	n/a
V	----	-	----	-
VI	9Ce51			V
	9Ce93			IV
	9Ce135			IV
	9Ce151			II
	9Ce157			II
	9Ce160			IV
	9Ce163			II
		7	31.8	

We were rather surprised at the relatively low frequencies of site classes I and II, the presumed low density/minimal activity sites, at Fort Benning in contrast to what we saw at Fort Polk which was set in an environmentally similar area. Survey areas in both reservations were dominated by small drainages, narrow floodplains and typical Southeastern forest floral and faunal associations.

To obtain a better comparison of site class data, we prepared Table 10, which lists the frequencies of sites in each class from our Fort Benning survey, RSA's previous Fort Benning survey (Kohler et al. 1980) and our results from Fort Polk.

TABLE 10. COMPARISON OF FORT POLK AND FORT BENNING SITE CLASS PERCENTAGES.

Location	Site Class	# of sites	% of sites (total)
RSA-Fort Benning	I	5	19.2
NWR-Fort Benning	I	8	36.4
Fort Polk	I	109	61.2
RSA-Fort Benning	II	1	3.8
NWR-Fort Benning	II	2	9.0
Fort Polk	II	39	21.9
RSA-Fort Benning	III	0	0.0
NWR-Fort Benning	III	3	13.6
Fort Polk	III	7	3.9
RSA-Fort Benning	IV	1	3.8
NWR-Fort Benning	IV	2	9.0
Fort Polk	IV	10	5.6
RSA-Fort Benning	V	0	0.0
NWR-Fort Benning	V	0	0.0
Fort Polk	V	3	1.7
RSA-Fort Benning	VI	19	73.0
Fort Benning	VI	7	31.8
Fort Polk*	VI	10	5.6

* (For the purposes of this comparison the number of sites yielding ceramics in each site class at Fort Polk has been subtracted from that site class total and a site class VI has been created--for original data on Fort Polk see Thomas et al. 1982:99, 1-31.)

Also, however, differences are pretty dramatic within Fort Benning proper as evidenced by the comparison of our results and those of RSA. These comparisons show that there are substantial differences between environmentally similar areas such as Forts Benning and Polk, pointing to cultural explanations for site class representations. Several factors may account for these differences and are examined separately.

First, with regard to the differences between Fort Polk and Fort Benning in general, the documented incidence of Archaic sites in the latter project area is considered low; it is assumed that Archaic minimal activity hunting or processing stations account for the large percentage of Class I and II sites at Fort Polk, where the documented occurrence of Archaic sites is significantly higher (Thomas et al. 1982; Gunn n.d.; Servello n.d.a., n.d.b.). Second, land disturbance from military activities at Fort Polk has been apparently more significant than at Fort Benning. Fully half of the Fort Polk Class I sites occur in locations with moderate to major disturbance (Thomas et al. 1982:158), and the actual number of Class I sites may be inflated at Fort Polk due to disturbance.

It is the factor of disturbance which may also account for the second trend observed. The number of site Class VI sites, as noted, seems higher than expected. If the presence of ceramics at these sites is discounted for the moment, the seven Class VI sites would classify under site classes II, IV, and V (see Table 9). The presence of ceramics at high density/intensive activity sites is, of course, not unexpected.

The presence of ceramics at low intensity/minimal activity sites is something of another matter. Of course, two explanations are that these sites represent short term residence locations, or that the ceramics present represent nothing more than the result of a single pot drop. Another possibility must be considered, however; that of possible site disturbance. If the three Class VI which would reclassify as Class II sites occur in disturbed areas, then the possibility must be entertained that in actuality these sites were originally Class III, IV, or V sites that have been disrupted by disturbance.

An examination of the site data on each indicates that two of the sites (9Ce151 and 9Ce157) are, however, minimally disturbed; the third site, 9Ce163, has experienced significant impact from logging operations. It would appear then that one of the first two explanations for the presence of the ceramics is likely; each of the sites is in close proximity to Hollis Creek and the minimal number of ceramics at each site may be accounted for by single pot drops or short term residence adjacent to the creek.

In comparing our data with that of RSA, we are struck, but not necessarily surprised at, the large number of Class IV sites in the latter's study. As we have mentioned before, the RSA work was conducted in Halloca Creek, which hosts a larger floodplain than any drainage in our study area. Overall, when their sites are arbitrarily placed within our classes, the data are more similar than was the case for comparing Fort Benning as a whole with Fort Polk as a whole. Although environmental diversity, evidenced, for example, in broader floodplains in RSA's study area, does suggest potential cultural differences in site distribution, in general the RSA data are more similar than disparate to our data.

This exercise was based on very limited information and a very low total site number. Closer examination of data from excavated sites should shed more light on the relationship of site function to site classes and both of these to environmental location.

Historic Sites

Historic homesteads and artifact scatters tended to be concentrated along Box Springs and Red Diamond Roads, both of which were constructed and in use long before the establishment of Fort Benning. Definite evidence of one mill, a small cotton gin, was found in the form of a large earthen dam, sluice, and the remains of a saw-toothed apparatus for separating the seeds from the cotton. Two other dams located within the project area were small and appear to have been agricultural or farm constructions. Although many evidences of military activity such as bunkers, simulated rocket implacements, and sand-bagged foxholes were found in the project area, these were not considered significant sites and were not recorded as such.

As with the prehistoric sites, Appendix I presents a description of each historic site and, where applicable, associated artifacts. Although all of the site data are not discussed in this chapter, the results of our efforts to relocate sites either formally recorded or indicated on maps within the 2,200 ac survey tract does warrant some attention. In addition, the earlier illustration (Figure 10, this volume) is repeated here with tentative correlations between known or indicated sites and those found during our survey (Figure 16).

Cemeteries

The Cook and Hardison Cemeteries were discussed in Chapter Three. Both were relocated by our survey, but no additional information can be added.

House Sites

Cook Lands: It is of interest to note that an early historic site (9Ce150) was found in the northern portion of the survey tract, within the general vicinity of the Cook Cemetery. Although it could not be determined whether this site had been used by either the Cook or the Redd family, its use by one or the other is a logical assumption.

Matthews/Hollis Mill: No historic materials that could possibly pertain to Matthew's or Hollis's Mill were recovered during the survey of the 2,200 ac tract. It must be assumed that modifications to the Schley Pond Dam, as well as any adjustments in the location of adjacent Red Diamond Road, have obliterated any structural or artifactual remains of the mill complex.

Big Sandy School: During the pedestrian survey of the project area, probable evidence of the Big Sandy School was recovered in the form of Isolated Find #5. Consisting of one undecorated ironstone

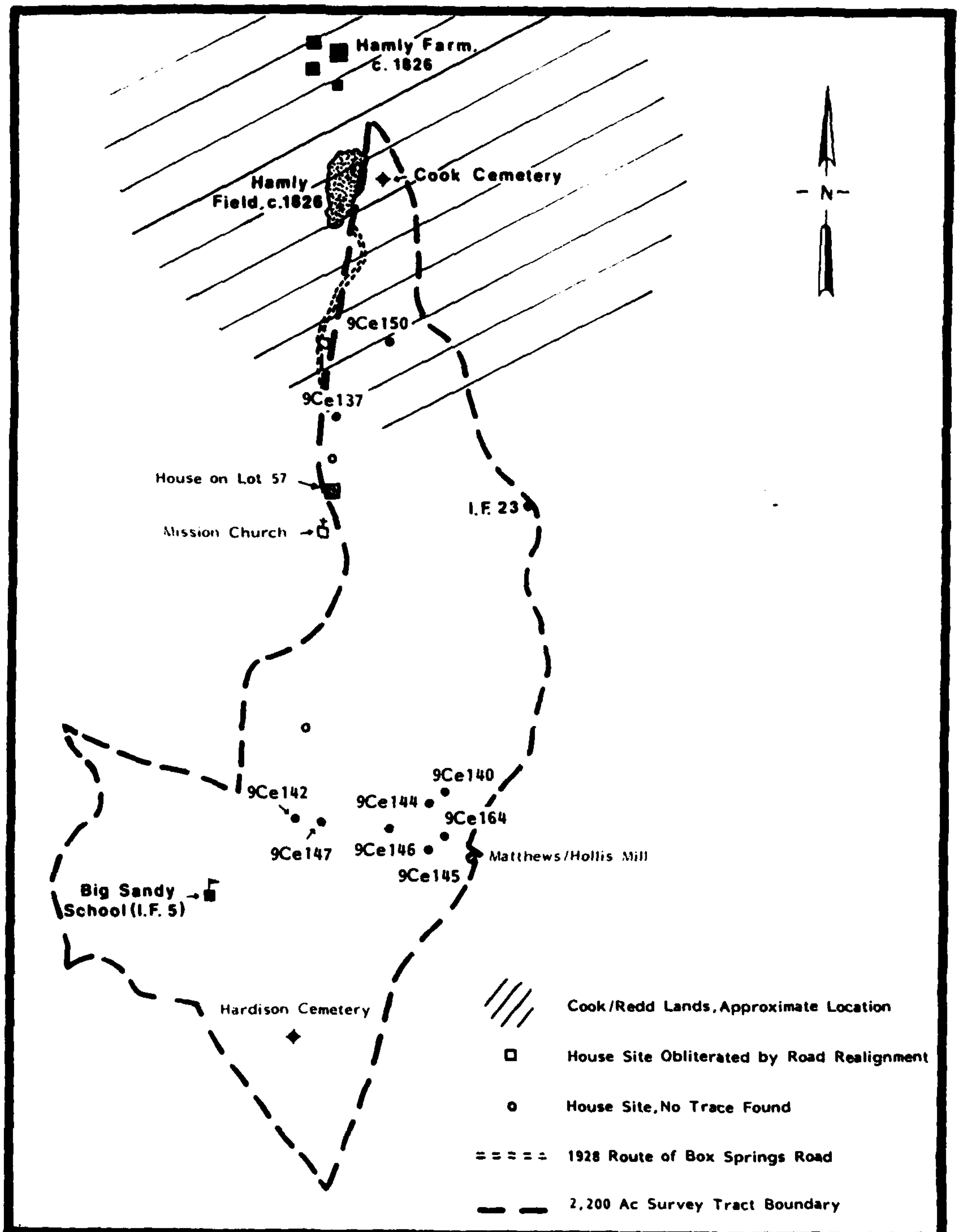

FIGURE 16. LOCATION OF NWR SITES AND ISOLATED FINDS IN RELATION TO KNOWN HISTORIC PROPERTIES.

NWR

sherd and a brick fragment, I.F. 5 represented the only historic artifactual material found within the reported area of the school.

House on Lot 57: No evidence of a structure or artifactual concentration was discerned within Lot 57, but the proximity of this lot to the subsequent military activity around Bush Hill might account for its presumed obliteration.

King Family Holdings: The area immediately west of Schley Pond was probably first occupied by James Whittle in the second half of the 19th century. In 1891, Whittle sold land in Lots 41-43, 54-56 to J.W. Bush. The land remained with the Bush family until 1910, when Loula B. Bush sold land in Lots 41, 55 and 56 to Oscar King. Perry King, presumably a relative, bought land east of Schley Pond in the same year. In 1913, George King, son of Oscar, bought additional property west of the pond (John Metcalf, personal communication).

According to the Fort Benning Tract Acquisition Register, Perry King owned and presumably occupied Tract 358 within Lot 74. It can perhaps be presumed, but cannot be demonstrated, that he was related to the Kings mentioned by Metcalf. The Tract Acquisition Register also indicates an irregularly shaped tract (Tract 342) situated between Red Diamond Road to the south, and the unnamed public road to the north and east that runs diagonally from Red Diamond to the northwest. This tract, owned by Sweet T. King prior to Federal purchase and located just west of Schley Pond, corresponds with the historic artifactual material recovered from 9Ce144. It can thus be assumed that the cultural material found at 9Ce144 is the remains of the King families residence, and possibly that of the earlier Whittle and Bush families as well.

Roads

As expected, given the historical significance of Red Diamond Road, most historic properties were found along that corridor. Along Box Springs Road, which is a more recent construction, three structures were noted on the 1928 county soil map. Two of these former structures are probably represented by 9Ce137. All traces of the northern-most structure were probably destroyed when two jogs in Box Springs Road that appeared in the 1928 map, were eliminated after the acquisition of the area by the Federal Government. Remnants of the southern-most structure could not be located.

DISTURBANCE EVALUATION

Although a formal study of reservation-wide disturbance was not required on this project, we did undertake an informal examination of disturbance factors. Our interest lay in isolating the types of disturbance and the areas which might be affected the most by these factors. Toward this end, notes in disturbance were kept during the survey and each site was examined in light of the nature and intensity

of disturbance. Following is a brief assessment of what we see as the primary factors of disturbance and their potential for impacting cultural resources.

Tracked Vehicles

Disturbance created by military activities is derived principally from tracked vehicle movement (e.g., tanks). Tracked vehicle movement in the uplands is frequent and sites, usually situated on ridge noses or ridge tops, in these locales are most vulnerable to impact. We have no specific data on the nature and intensity of vehicle movement on a year by year basis (e.g., location, type of exercise, type of tank, etc.), but we do know that such activity has been ongoing since the 1940s. At some point, probably most of the upland areas have been subject to tracked vehicle activity. The result is a kind of blanket "plow zone" over the areas affected. Naturally, this can result in significant disturbance to cultural resources, especially those with minimal subsurface expression.

Not all areas of the Reservation are impacted by such activity. Tanks rarely venture into the bottomlands, so sites situated in this environmental setting are probably less subject to disturbance. Occasional movement onto floodplain terraces can impact sites, but where we investigated sites in these settings in our survey tract (particularly the northern part), little disturbance of this nature was noted. Further, tanks do not move on steep slopes. Although sites are not located on steep slopes, we do find an occasional situation where a flat area juts out from the face of a slope and sites are frequently found on these flat areas. They are, however, well protected from tank movement because of the surrounding slope.

Roads

Finally, roads and areas of access around them in any environmental setting could be potentially subjected to great disturbance by tank turn-arounds, even if no movement through the area is conducted.

Timbering

Disturbance related to the timbering industry has occurred at Fort Benning, but we have little data as to precise areas, types of equipment, and intensity of activity. Any area that has been timbered suffers the effects of vehicle movement (e.g., large and often deep ruts) and timber removal (in dragging trees, artifacts can be displaced). Also, erosion occurs as a result of timbering activities. Over time, however, areas which have been exposed to this activity silt in, vegetation covers the ground, and the area takes on an appearance similar to that prior to timbering. Evidence of timbering can be seen in subsurface exposures which reveal, again, the blanket plow zone like stratum.

Other Forms of Disturbance

Other aspects of military disturbance arise from the razing of historic structures after Government acquisition, relic-seeking, and general maneuvers over the area. The razing of historic structures disturbance is obvious: visible remains are all but obliterated during such operations. We have no real grasp on the extent of amateur collection at Fort Benning, but if it is anything like other military installations we have worked on, some probably occurs while troops are on maneuvers or during recreation activities. The primary disturbance from this activity is the removal of diagnostic artifacts such as projectile points or, less frequently, ceramic sherds. This can result in some sites being undatable at the survey level. Finally, general movement over the area can create artifact displacement, but no measure of this is obtainable at this time.

Summary

The major factors of disturbance are tracked vehicle movement, road construction and timbering. The areas most vulnerable to these activities are in the uplands, particularly topographic settings such as ridge crests and ridge noses. Sites in these settings are more likely to exhibit major severe disturbance than in the terrace or floodplain settings. Disturbance will not only be surficial, but subsurface as well. Therefore, areas of midden or features may be impacted, if not destroyed.

Table 11 lists the sites investigated by our survey, their topographic setting, contexts, and degree of disturbance. Of the sites, 81.8 percent are situated in areas most likely to be impacted by tracked vehicles, wood construction, or timbering. Sixty-three percent of these exhibit major to severe disturbance. In contrast, only 16 percent of the sites on low terraces and floodplains exhibited similar degrees of disturbance.

Many sites at Fort Benning have probably already been impacted by such activity since the topographic settings especially favored by prehistoric groups (see Chapter Seven) are also those most frequently used for maneuvers. In terms of site survival then, upland areas, especially ridge crests and ridge noses, would have a lower site expectancy than terraces or floodplains. All areas, however, are potentially subject to minor forms of disturbance (e.g., that generated by relic seekers).

TABLE 11. SITE DISTURBANCE RATINGS

Site No.	Location	Affiliation	Disturbance
9Ce134	first terrace	lithic scatter	minor
9Ce135	ridge crest	lithic scatter	major
9Ce136	sloping ridge crest	lithic scatter	minor
9Ce137	ridge crest	historic house	minor
9Ce138	sloping ridge crest	lithic scatter	severe
9Ce139	sloping ridge crest	lithic scatter	major
9Ce140	ridge crest	historic house	major
9Ce141	edge ridge crest	lithic scatter	minor
9Ce142	ridge crest	house site	moderate
9Ce143	ridge crest	lithic scatter	severe
9Ce144	ridge crest	house site	severe
9Ce145	ridge crest	house site	severe
9Ce146	ridge crest	historic artifact scatter	minor
9Ce147	ridge crest	historic house	moderate
9Ce148	across an intermitent stream	dam	minor
9Ce149	across an ephemeral stream	dam	minor
9Ce150	ridge crest	historic artifact scatter	moderate
9Ce151	terrace	lithic/ceramic	minor
9Ce152	ridge nose	lithic scatter	severe
9Ce153	ridge nose	lithic scatter	minor
9Ce154	ridge nose	lithic scatter	severe
9Ce155	floodplain	mill	minor
9Ce156	ridge slope	lithic scatter	severe
9Ce157	first terrace	lithic scatter	minor
9Ce158	ridge crest	lithic scatter	moderate
9Ce159	ridge crest	historic artifact scatter	moderate
9Ce160	ridge nose	prehistoric/historic	severe
9Ce161	ridge nose	prehistoric/historic	severe
9Ce162	ridge slope	lithic scatter	major
9Ce163	terrace and upland	lithic scatter	severe
9Ce164	ridge crest	historic artifact scatter	severe
9Ce165	ridge crest	lithic scatter	severe
9Ce166	ridge crest	lithic scatter	severe
Previously Recorded			
9Ce51	first terrace	prehistoric/ceramic	minor
9Ce93	ridge crest	prehistoric/ceramic	severe

CHAPTER SIX

MODEL TESTING AND EVALUATION

Part of our evaluation of resource potential included testing the applicability of RSA's model. In our research design (Chapter Four), we outlined the basis of RSA's model; however, to set the stage for the ensuing discussion, a brief review of their work is in order.

GENERAL INTRODUCTION

Review of RSA Model

The model developed by RSA (Kohler et al. 1980) was derived from data obtained during their 1978 survey of a 16.2 sq km area surrounding Halloca Creek. They identified 21 prehistoric sites upon which the model was formulated (no formal model was developed for historic sites).

A total of six variables were examined in regard to prehistoric site location:

1. vegetation
2. soil
3. water
4. slope
5. relative elevation
6. distance to roads

After examining each variable (see Chapter Four), RSA eliminated those that had no significance, retaining three which appeared to have predictive power: v-2 [soil], v-4 [slope] and v-3(a) [distance to nearest water source].

The values of these three variables were, then, ranked as favorable or unfavorable for site location. So, for example, individual soil types (such as Norfolk sandy loam) were given one or the other rank designations. Distance to nearest water was ranked in a similar fashion. In this case, two states were defined: a favorable distance (75 - 225 m) and an unfavorable distance (0 - 75 m and greater than 225 m). The third variable, slope, was also rated as favorable (0 - 10 percent) and unfavorable (greater than 10 percent) for site location.

Thus, six states (two each for the three variables) were derived and, then, combined into three states based on the plus and minus ratings. Thus, a plus (or favorable) rating on all three variables (soil, water, slope) is considered to be the stratum of maximum likelihood for site location. When plus ratings occur on any two of the three variables, the stratum is considered of intermediate probability for site location. If only one, or none, of the three variables has a favorable rating, it is considered the stratum of least likelihood for site location.

As we have previously pointed out (Chapter Four), high probability areas include only one of the possible combinations of variables: those areas encompassed by one of the favorable soils (e.g., Norfolk sand) where the slope is less than ten percent, and situated in areas between 75 m and 225 m from water.

In order to present the probability zones visually, RSA plotted each of the three variables on a 1:25,000 map. The resultant map showed six levels of information (two ratings for each of the three variables). These were then combined in the manner described above and a map prepared depicting the combination in three probability zones: high, medium and low.

Based on these ratings, RSA's site distribution was as follows:

Probability	Acreage	# of Sites	Sites/Ac
High	270	11	1/25
Medium	780	9	1/85
Low	2950	4	1/750

Again, as was discussed in Chapter Four, we plotted our survey tract on RSA's maps and used a planimeter to compute the total acreage encompassed by each probability zone (Figure 17). Our expected site frequencies are repeated below for reference.

FIGURE 17. NWR SURVEY AREA PLOTTED ON RSA MAP SHOWING HIGH (solid), MEDIUM (dotted) AND LOW SITE PROBABILITY ZONES.

0 2 km

NWR

Probability	Percent	Acres	Expected No. Sites
High	13.3	293	12
Medium	25.5	560	6
Low	61.2	1347	2
EXPECTED TOTAL			20

The total prehistoric sites expected was 20 if RSA's model has broad applicability. Our survey located 22 prehistoric components, not a significant increase over the expected site frequency. However, acceptance of the model's applicability depended upon more than just a comparison of the expected and observed site frequencies. In order to test RSA's model, it is important that the two study areas be comparable in terms of soils, hydrology and slope.

General Comparison of Survey Areas

In general, the soils of the two areas differ in two ways. First, some of the soil types which occur in the Halloca Creek study area are not found in the 2,200 ac surveyed by NWR. Second, the acreage and percentage comprised by the soil types in the study areas vary to some degree. For example, Susquehanna clay is well-represented in RSA's study area, but proportionately less represented in ours.

With regard to water, the two areas are drained by different streams. Halloca Creek in RSA's project area is much larger than either of the two drainages, Hollis Branch or Sally Branch, located in our study area. Halloca Creek is identified as a stream with large quantities of fresh water perennially plentiful. Discharge at Halloca Creek is included in the class of streams that discharge 150,000 to 1,500,000 gal of water per day. In our study area, Sally Branch is classed as a stream with small quantities of water available during low water stages and moderate quantities during high water periods. Discharge ranges from 1,500 to 15,000 gal per day. Hollis Branch is even smaller, with meager quantities of water available during the dry season. Discharge is less than 1,500 gal per day (1976 Terrain Analysis Map). Further, Halloca Creek has a much larger floodplain than either Sally Branch or Hollis Branch: this doubtless would be reflected in site density, location and, probably, type of site.

To compare slope, we used the 1976 Terrain Analysis Map which classifies the Halloca Creek drainage basin and the western portion of RSA's study area as Low Plains, divided as predominantly flat to gently rolling surfaces in floodplains and gently to moderately rolling plains elsewhere. Local relief, between 25 m and 45 m, slopes from three to 15 percent outside the floodplains. About 50 percent of RSA's study area is characterized in this manner. In contrast, the eastern part of RSA's area is classed, like 98 percent of our project area, as High Plains. Local relief, between 55 m and 65 m, slopes

between eight and 15 percent, and valley slopes range between 15 to 30 percent. Thus, the topography in our study area is rather rugged, being similar to the eastern portion of RSA's study area, but notably different from their western part.

These general observations point up some obvious differences between our study area and that surveyed by RSA. However, it must be borne in mind that, while variation occurs, both study areas occupy generally upland locations. Although Halloca Creek does host a more extensive floodplain, there are closer similarities between RSA's survey tract and ours than would be if we were comparing one or the other to, for example, a survey tract in the larger Chattahoochee River drainage.

The simple fact that our observed site frequencies do not depart very much from the expected site frequencies based on RSA's model would tend to suggest that the two study areas are more comparable than disparate. However, the differences do exist, and if the applicability of RSA's model is to be fully evaluated, they cannot be dismissed without examination of the variables in greater detail. Specifically, we need to take a critical look at the way in which RSA evaluated each variable and how the distribution of our sites (particularly the prehistoric sites) compares with their evaluation.

VARIABLE EVALUATION

Of the three variables used in RSA's model, soil appeared to have been measured with the greatest control. Several very obvious problems exist with their evaluations of water and slope so these variables are discussed first.

Water

In examining the relationship between site location and water, RSA determined that distance to nearest water was a critical variable in site selection. This conclusion was reached by comparing the site data to a set of computer-generated points which were randomly located throughout the drainage. They found that the aboriginal sites were further from water than a randomly generated set of points. Although the statistical significance of this variable is not especially great, RSA did include it in their model. Viewed in terms of discrete site data, the mean distance to closest water for the aboriginal sites was about 150 m with a standard deviation of about 70 m. Since about two-thirds of the sites will be located within one standard deviation, most would be expected between about 75 m and 225 m from a stream.

This variable is simply measured, and we have no reason to suspect its utility. They note that upon completing the maps, it became obvious that no point on the Reservation was more than one kilometer

from a stream, and over 90 percent of all points fall within 500 m of a stream.

There is a problem, however, with the map prepared by RSA. In order to make the mapping more manageable, and to focus on 'likely' areas, they disregarded all intermittent tributaries less than 500 m in length. Flowing tributaries, as indicated on the 1:25,000 map, were retained. By eliminating many of the intermittent tributaries, numerous locations in the uplands appear on the map as being in an unfavorable locus in terms of distance to water, whereas, according to the definition and ranking of the variable, the locus is favorable. The result is that the maps will portray some upland zones as being lower in site potential than is actually the case.

Slope

In considering slope, RSA employed a differential method of coverage for areas with greater and less than 10 percent slope. In the former case, shovel pits were excavated at 90 m intervals, while in the latter, they were excavated at 30 m intervals. While we recognize the erosive factors of colluviation in making this judgement, there are often areas where flat, habitable surfaces occur on steep slopes and sites may frequently be found in these locales (site 9Ce136, found during our survey is an example of such a situation).

These areas are often not visible from ridge tops or level terraces and floodplains and frequently are not easily identifiable from topographic maps. As such, it is necessary to consider these potentially habitable areas with a survey approach consistent with overall project procedures. We do understand that RSA's evaluation of slope percentage was based on field observation, thus topographic variation was taken into account (Timothy Kohler, 1982 personal communication), but the measurement of this variable (field judgement) was not such that it could be accurately replicated by our work. Thus, we cannot evaluate their considerations of slope without redrafting the maps and comparing results.

Soils

There are 28 soils noted in Chattahoochee County in the 1928 soils manual. RSA has ranked these as being favorable or unfavorable for site location. In their evaluation, 11 soils are ranked as favorable while the remaining 17 are deemed unfavorable. However, five of the 11 soils considered favorable for site location do not occur in their study area (Ot, Cs, Of, Wc, Wf, As), and seven of the 17 soils considered unfavorable for sites are, likewise, absent (N, R, Nf, Ro, Ca, Ct, Ms) (see Table 12 for correlations of soil abbreviations with formal nomenclature).

Although these soil zones are absent from their study universe, RSA has ranked them and incorporated them into their model of site

AD-A136 248 AN INTENSIVE SURVEY OF A 2200 ACRE TRACT WITHIN A PROPOSED MANEUVER AREA A..(U) NEW WORLD RESEARCH INC POLLOCK LA P M THOMAS ET AL. 1983 CX5000-2-0087

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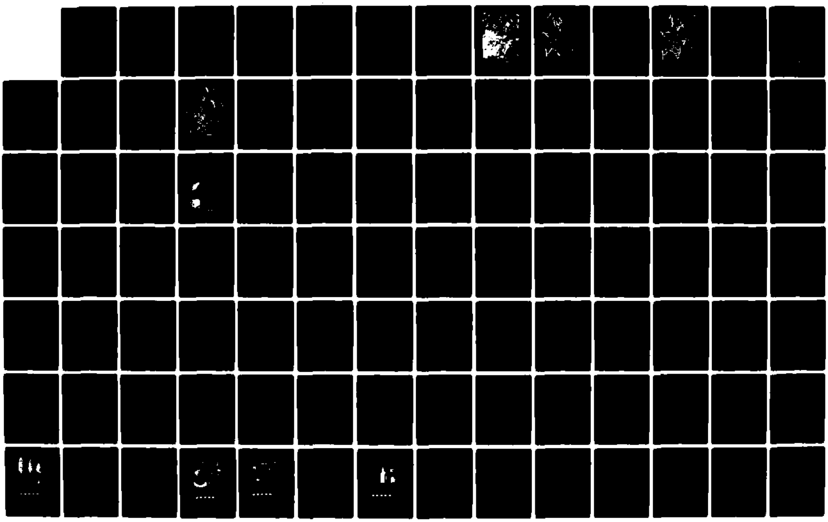

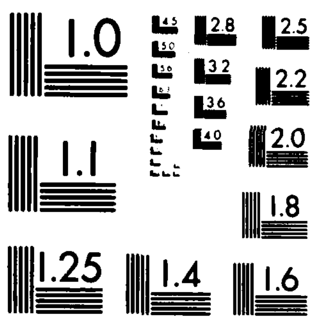

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

TABLE 12. CORRELATION OF 1928 SOIL MAP ABBREVIATIONS WITH FORMAL SOIL NOMENCLATURE

1928 Map	
R	(Ruston coarse sand)
Rs	(Ruston sand)
K	(Kalmia sand)
N	(Norfolk coarse sand)
Nf	(Norfolk fine sand)
Ns	(Norfolk sand)
Cs	(Cahaba sandy loam)
Ks	(Kalmia sandy loam)
Nl	(Norfolk sandy loam)
Of	(Orangeburg fine sandy loam)
Ol	(Orangeburg sandy loam)
Rl	(Ruston sandy loam)
Rl	(Ruston sandy loam)
Rl	(Ruston loamy sand/ gravelly)
Oy	(Ochlockonee sandy loam)
M	(Meadow)
Hs	(Hoffman sandy loam)
Sf	(Susquehanna fine sandy loam)
Ss	(Susquehanna sandy loam)
Sc	(Susquehanna clay)
Rg	(Rough gullied land)

location. Kohler (1982, personal communication) notes that they did so in response to project requirements mandating a reservation-wide predictive model and, further, on the basis of the non-random distribution of post-Archaic sites with respect to productive soil types.

While we can understand their rationale, we have found that even though it may be the characteristics of a soil (rather than the soil) that are selected for in settlement decisions, it is unwise to make assumptions without adequate sampling. Although a soil zone may indeed yield evidence of sites, what is important is the relative frequency of these sites. When evaluations are made on unsurveyed areas we are making a priori suggestions of site frequency. These constitute expected site frequencies that may not hold upon after actual field inspection of such areas.

Another problem is that very small areas of some soil types occur in the RSA study area (Susquehanna fine sandy loam [Sf] and Orangeburg Sand loam [Ol], for example); each comprise an area of only .02 sq km (ca. 5 ac), while Leaf Fine sandy loam (Lf) comprises an area of only .03 sq km (ca. 7.4 ac). In a study of 4,000 ac, five acres is only 0.1 percent of the total area investigated. With such a small sample, it is highly doubtful that a meaningful evaluation can be made of the relationship of the soil type to site location. In this case, sample error could dramatically affect the results.

The question of how RSA determined whether a soil is favorable or unfavorable for site location is also of some consequence. They did this by first tallying the acreage comprised by each soil zone in their study area and, then, determining the frequency of sites in each soil zone. Then, calculating the observed and expected frequencies, RSA used a Chi Square test to show that the relationship between sites and soils is not random. Next, they placed a binomial confidence interval around the expected cell frequencies at the 95 percent confidence level. This approach, likewise, demonstrated the fact that sites are not randomly distributed with regard to soil type. They concluded that the soils most responsible for the non-random distribution of sites is prehistoric selection for Norfolk sandy loam and avoidance of Susquehanna clay. Finally, they attempted to relate prehistoric site location to agricultural potential of soils, but the results were inconclusive.

Having shown that two soils, Susquehanna clay and Norfolk sandy loam, depart from a random distribution in terms of site frequencies, RSA proceeded to rank soils as favorable or unfavorable to site location, but it is not entirely clear how they determined the rank of each soil.

They considered Norfolk sand (Ns) as favorable along with five soils rated as having high agricultural potential (Oz, Ks, Nl, Ol, and Cs). Norfolk sand (Ns) is not rated high in agricultural potential, and according to RSA's binomial confidence interval presented in their Table 4 (Kohler et al. 1980:63), the number of sites they found

in Ns is within the range expected if soils are unrelated to site location. Yet, RSA gave Ns a favorable rating for site location. At the same time, Susquehanna sandy loam (Ss) seems to have precisely the same attributes, in terms of site location, as Norfolk sand, but Ss is rated as unfavorable for site location. Ss is rated the same as Ns for agricultural potential (i.e., intermediate). Similar to Ns, the RSA survey found sites on Ss and also similar to Ns, the number of sites on Ss soil (5) is within the 95 percent binomial confidence interval. But, whereas Ns is ranked as favorable, Ss is ranked unfavorable with the following comment:

> "Careful readers will note that this dichotomization of states for the variable soil is a simplification which intentionally ignores the fact that some soils such as Susquehanna sandy loam support the approximate number of sites anticipated under conditions of random site location. It is important to note that such soils were not actively selected" (Kohler et al. 1980).

So, it appears RSA has used the same criteria to rank one soil zone favorable and a second with similar characteristics, unfavorable.

Another soil, Ruston sandy loam (Re), is ranked as unfavorable and, again, the reasoning is suspect. Re is scored as of intermediate agricultural potential, similar to Ns and Ss, which, as we see above, could lead to either favorable or unfavorable ratings. The unfavorable rating for Re is apparently due to the fact that there is an "observed avoidance of this soil type on the Halloca Creek drainage" (Kohler et al. 1980:72). One site was located in Re, and according to RSA's binomial confidence interval, the site frequencies for Re are not within the 95 percent confidence interval. As they state, this suggests that there is an avoidance of Re soils. What we do not understand is why the statistic is used in determining some rankings and disregarded in others. If the rankings are really judgemental, it should be so stated.

Finally, there is no clear explanation of why soils rated good for agriculture are consistently ranked as favorable for site location. RSA's attempts to correlate site location with soil productivity proved fruitless. In their words, "We conclude that the relationship between soil productivity classes and site location...is marginally significant" (Kohler et al. 1980:65). If agricultural potential is not important for site location, one cannot help but wonder why agricultural potential was selected as one of the main bases for classing soils as favorable or unfavorable for settlement. Although the reasoning is obscure, there are oblique references in RSA's report to the fact that drainage is of importance in site selection (Kohler et al. 1980:65) and that well-drained soils, which tend to be good for agriculture, were selected for settlement.

Regardless of questions concerning the logic of RSA's soil ratings, we must for the moment, accept their ratings if we are to test their

model. In view of the proximity of the study areas (the eastern boundary of RSA's study area is located within only 200 m from the western border of our project area), it is to be expected that the model will be applicable to our study area. But even though the areas are close together, there are some differences as pointed out previously and their significance must be evaluated.

Comparison of Soils Within the Study Areas

Table 13 lists all prehistoric and historic sites found by both surveys and places them in relation to soil type. It will be noted that differences do occur, but some of these are directly attributable to presence or absence of some soil types in one or the other survey areas. For example, we found two prehistoric sites on N soils, which was not even represented in RSA's survey tract. Looking at the distribution of soils, we find that of the 11 soils in Chattahoochee County ranked as favorable for prehistoric site location by RSA, 6 do not occur in our study area, but five do. Of the 17 soils deemed unfavorable for sites by RSA, eight do not occur in our study area, while nine do. So, we have a total of 14 soil types in our study area (5 favorable, 9 unfavorable), while 14 soil types are absent.

Table 14 lists the occurrence of each soil type and associated site density within both RSA's survey tract and that surveyed by NWR. Although the general soils composition of the two areas is similar, four soil types occurred in RSA's study tract that were absent in ours. One of these is listed as a favorable soil type (Cs) and three are unfavorable for site location (Sf, Hs, Lf). Two other unfavorable soils (N and R) made up 8.9 percent of our survey area, but were not present in RSA's. In many cases (e.g. Ns), differences in site frequencies between the two projects appear to relate to the percentage of the soil type encompassed within each survey area. Three cases, however, are noteworthy. For example, Nl comprised approximately equivalent percentages of both survey areas (NWR - 0.8 percent and RSA - 0.9 percent); yet, RSA found four prehistoric sites to our one on this soil type. For the unfavorable soils, there was approximately equal representation of Ss (NWR - 19 percent and RSA - 18 percent). Despite the close representation, RSA found five sites on Ss and NWR found none. These variations led us to question whether better control over the soils data would affect comparison of the two sets of data.

To do so, we examined the RSA work maps which showed their plottings of soil zones and compared these with the 1928 soil map. We found the plottings to be generally accurate. Figure 18 shows the 1928 soil map with our project area outlined while Figure 19 shows the RSA work map with the scale enlarged to 1:25,000 and our project area outlined. The soil zones rated favorable by RSA are combined in Figure 19, so individual soil zones do not appear.

TABLE 13. FREQUENCIES OF PREHISTORIC SITE OCCURRENCES BY SOIL CLASSIFICATION

	FAVORABLE					UNFAVORABLE			
Favorable Soils	NWR Prehistoric Sites	RSA Prehistoric Sites	NWR Historic Sites	RSA Historic Sites	Unfavorable Soils	NWR Prehistoric Sites	RSA Prehistoric Sites	NWR Historic Sites	RSA Historic Sites
Ns	12	6	8	5	N**	2	---	---	---
Nl	1	4	---	---	R**	---	---	1	---
Oz	2	1	---	---	Rs	2	---	1	---
*Ot**	---	---	---	---	Rl	1	1	2	---
*Cs	---	1	---	---	Ss	---	5	1	4
Ks	1	2	---	---	*Sf	---	---	---	1
Ol	---	---	---	---	Sc	---	---	---	---
*Of**	---	---	---	---	*Nf**	---	---	---	---
*Wc**	---	---	---	---	*Ro**	---	---	---	---
*Wf**	---	---	---	---	Rg	---	---	1	---
*As**	---	---	---	---	*Ca**	---	---	---	---
					*Ct**	---	---	---	---
					*Hs	---	---	---	---
					K	1	---	---	---
					*Lf	---	1	---	---
					*Ms**	---	---	---	---
					M	---	---	1	---
TOTALS	16	14	8	5	TOTALS	6	7	7	5

* Soils do not occur in NWR study area
** Soils do not occur in RSA study area

TABLE 14. COMPARISON OF RSA AND NWR SITE FREQUENCY IN RELATION TO FAVORABLE AND UNFAVORABLE SOILS

NWR					RSA				
Favorable Soils	Acres	%	# of Sites	%	Favorable Soils	Acres	%	# of Sites	%
Ns	941	41.6	12	54.6	Ns	464	12.6	6	28.6
Nl	18	0.8	1	4.6	Nl	32	0.9	4	19.0
Oy	29	1.3	2	9.0	Oy	165	4.5	1	4.8
Ks	34	1.5	1	4.6	Ks	44	1.2	2	9.5
Ol	35	1.5	0	0.0	Ol	5	0.1	0	0.0
Cs	0	0.0	0	0.0	Cs	130	3.5	1	4.8
TOTALS:	1057	46.7	16	72.8		840	22.8	14	66.7
Unfavorable Soils					Unfavorable Soils				
N	162	7.2	2	9.0	N	0	0.0	0	0.0
R	39	1.7	0	0.0	R	0	0.0	0	0.0
Rs	237	10.5	2	9.0	Rs	44	1.2	0	0.0
Rl	149	6.6	1	4.6	Rl	429	11.7	1	4.8
Ss	431	19.0	0	0.0	Ss	664	18.0	5	23.8
Sc	11	0.5	0	0.0	Sc	333	9.0	0	0.0
Rg	79	3.5	0	0.0	Rg	400	10.9	0	0.0
K	6	0.3	1	4.6	K	14	0.4	0	0.0
M	93	4.1	0	0.0	M	906	24.6	0	0.0
Sf	0	0.0	0	0.0	Sf	5	0.1	1	4.8
Hs	0	0.0	0	0.0	Hs	39	1.1	0	0.0
Lf	0	0.0	0	0.0	Lf	7	0.2	0	0.0
TOTALS:	1207	53.3	6	27.2		2841	77.2	7	33.4
GRAND TOTALS:	2264	100.0	22	100.0		3681	100.0	21	100.0

FIGURE 18. 1928 SOIL MAP WITH PROJECT AREA OUTLINED.

0 2 km

NWR

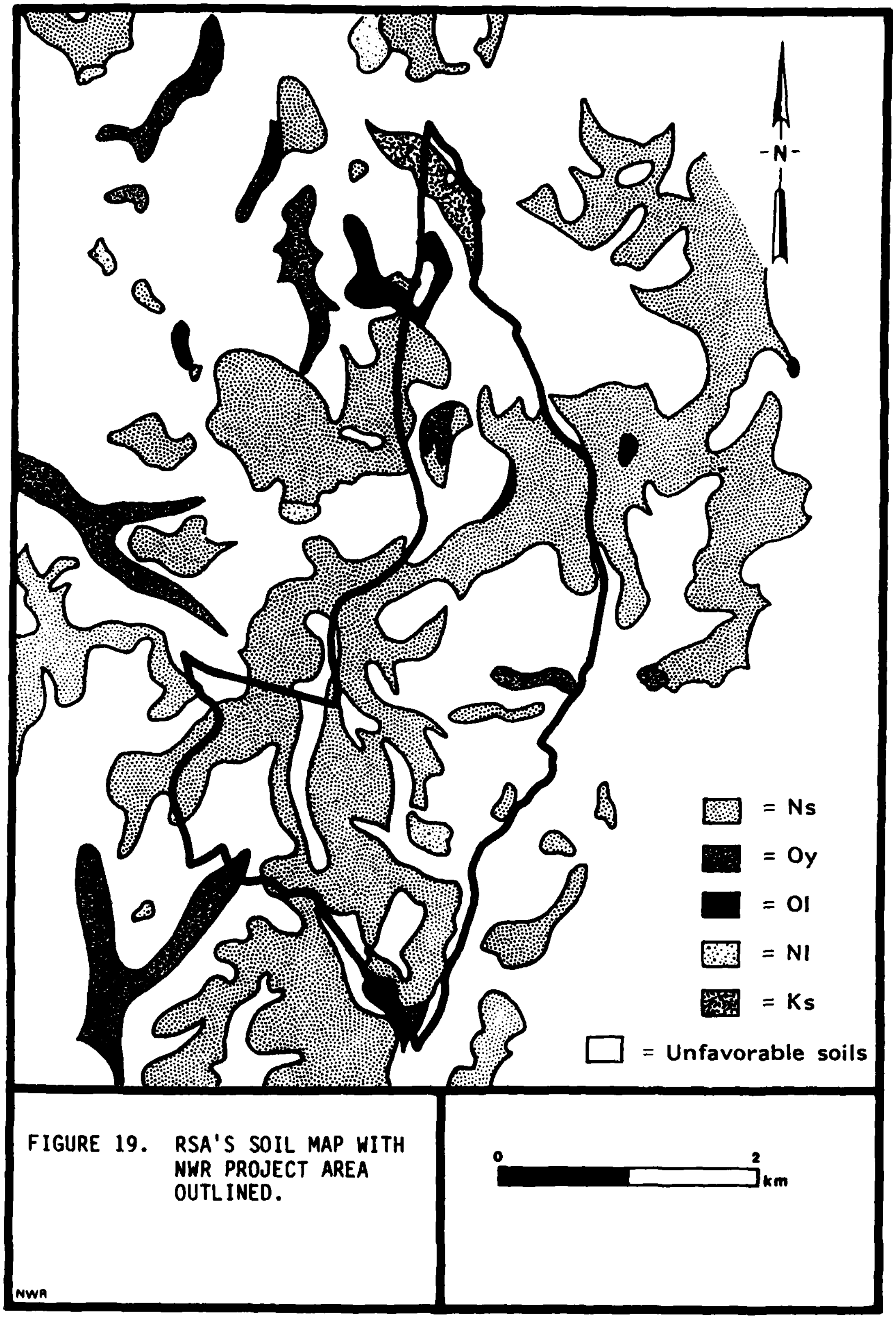

FIGURE 19. RSA'S SOIL MAP WITH NWR PROJECT AREA OUTLINED.

When the 1928 soil map and enlarged soil map are compared to the 1958 Terrain Analysis Soils map prepared by the U.S. Army, it appears that the same soil zones are represented on all sources. Figure 20 shows the soil zones depicted on the 1958 Terrain Analysis map with our project area outlined. Although the same soils are represented, the designations differ on the two maps. Table 15 correlates the soil terminology and symbols from the 1928 and 1958 maps. As can be seen, 14 soil types are represented in the study area on both maps.

Although the soils are equivalent on all maps, there are several discrepancies, particularly between the RSA map and the 1958 soil map. In Figure 21, the RSA soils are shown on the same map with the soils from the 1958 map. The bold line outlines the soil types combined and rated favorable by RSA while the shaded areas show the same ratings based on the soils as plotted on the 1958 map. As is evident in all parts of the project area, there are several notable differences in plottings. Depending upon which map was used, any given site's location might change in terms of its favorable or unfavorable rating. What is important here is whether the changes are sufficient to alter expected site frequencies.

In order to determine just how much of an effect the different soil maps could have on rating the locations, we first tabulated sites in terms of their location on favorable or unfavorable soils using the RSA map (Table 16). These plotting show 14 prehistoric sites on favorable soils and eight prehistoric sites on unfavorable soils. Historic site frequency is eight and seven respectively on favorable and unfavorable soils. Then, we plotted the same sites on the 1958 Terrain Analysis map. The results, shown in Table 17, show that sites did indeed change their ranking. In fact, five of the 22 prehistoric components showed a change in their soil rating (9Ce135, 9Ce138, 9Ce151, 9Ce153 and 9Ce156). However, as can be seen in the summary charts for both Tables 16 and 17, the relative frequencies remain identical: as many sites moved into favorable zones as moved into unfavorable zones.

In sum, it appears that the differences in the soil maps are not of great consequence for evaluating our prehistoric site densities. But the differences would be important in isolating particular variables. This point is returned to later when we adjust some of RSA's probability zone rankings (Chapter Eight).

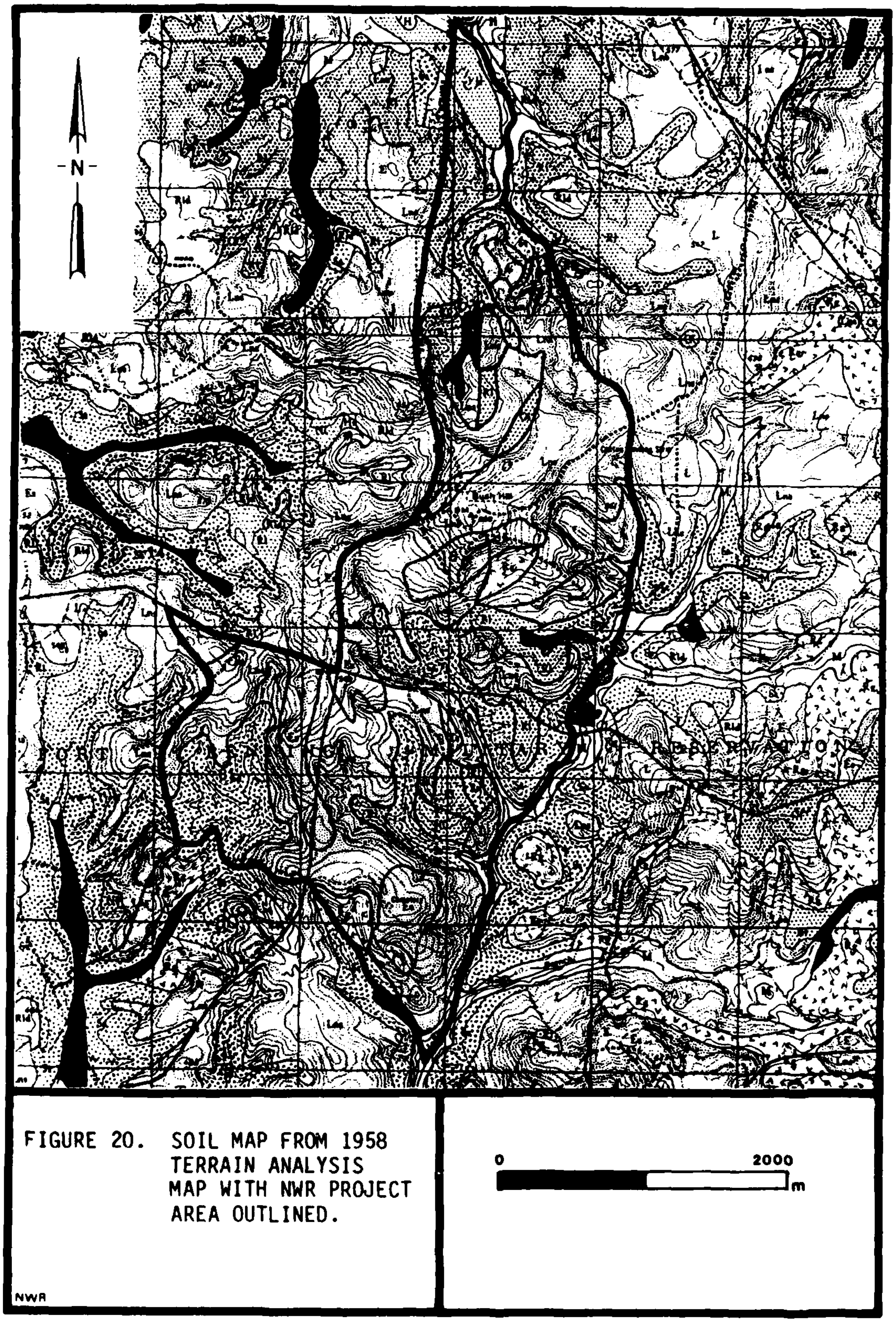

FIGURE 20. SOIL MAP FROM 1958 TERRAIN ANALYSIS MAP WITH NWR PROJECT AREA OUTLINED.

TABLE 15. SOILS ON 1928 AND 1958 MAPS OF STUDY AREA

1928 Map		1958 Map	
R	(Ruston coarse sand)	E	(Eustis course sand)
Rs	(Ruston sand)	Es	(Eustis sand)
K	(Kalmia sand)	H	(Huckabee sand)
N	(Norfolk coarse sand)	L	(Lakeland course sand)
Nf	(Norfolk fine sand)	Lfs	(Lakeland fine sand)
Ns	(Norfolk sand)	Lns	(Lakeland sand)
Cs	(Cahaba sandy loam)	Cs	(Cahaba sandy loam)
Ks	(Kalmia sandy loam)	Ks	(Kalmia sandy loam)
Nl	(Norfolk sandy loam)	Nl	(Norfolk sandy loam)
Of	(Orangeburg fine sandy loam)	Of	(Orangeburg fine sandy loam)
Ol	(Orangeburg sandy loam)	Ol	(Orangeburg sandy loam
Rl	(Ruston sandy loam)	Rl	(Ruston sandy loam)
Rl	(Ruston sandy loam)	Rld	(Ruston loamy sand)
Rl	(Ruston loamy sand/ gravelly)	Rlg	(Ruston loamy sand/ gravelly)
Oy	(Ochlockonee sandy loam)	Oy	(Ochlockonee sandy loam)
M	(Meadow)	M	(Meadow)
Hs	(Hoffman sandy loam)	Hs	(Hoffman sandy loam)
Sf	(Susquehanna fine sandy loam)	Sf	(Susquehanna fine sandy loam)
Ss	(Susquehanna sandy loam)	Ss	(Susquehanna sandy loam)
Sc	(Susquehanna clay)	Sc	(Susquehanna clay)
Rg	(Rough gullied land)	Rg	(Rough gullied land)

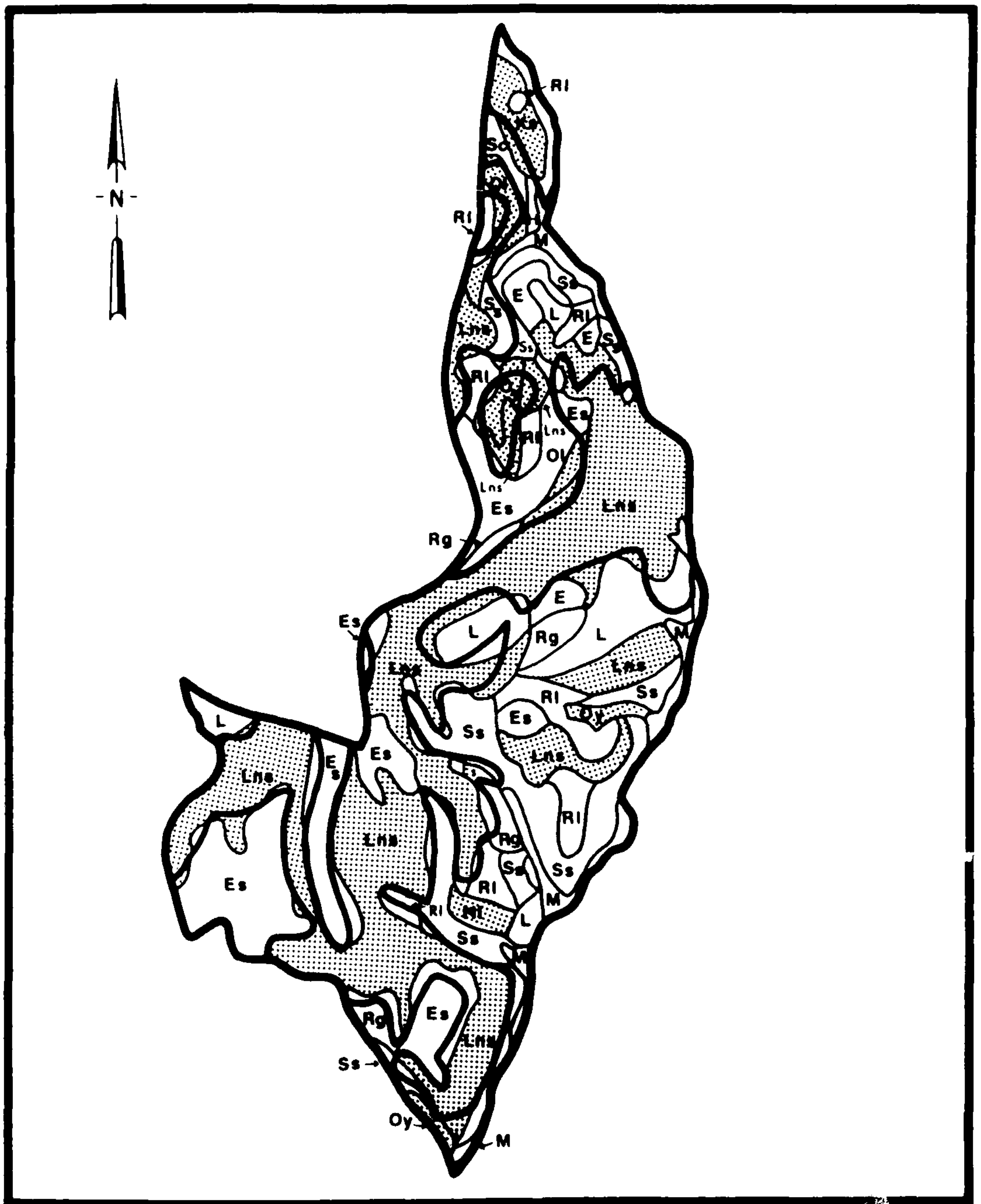

FIGURE 21. RSA'S SOIL MAP AND 1958 SOILS MAP SHOWING FAVORABLE LOCATIONS BASED ON SOIL TYPES.

0 2 km

RSA's favorable locations based on soil type

Favorable locations based on 1958 soils map

TABLE 16. PREHISTORIC AND HISTORIC COMPONENTS ON FAVORABLE AND UNFAVORABLE SOILS USING RSA SOIL'S MAP

	Favorable Soils Site #'s	Unfavorable Soils Site #'s
Prehistoric	9Ce51	9Ce134
	9Ce93	9Ce135
	9Ce136	9Ce139
	9Ce138	9Ce152
	9Ce141	9Ce153
	9Ce143	9Ce158
	9Ce151	9Ce163
	9Ce154	9Ce166
	9Ce156	
	9Ce157	
	9Ce160	
	9Ce161	
	9Ce162	
	9Ce165	
Historic	9Ce137	9Ce142
	9Ce140	9Ce145
	9Ce144	9Ce146
	9Ce147	9Ce149
	9Ce148	9Ce150
	9Ce159	9Ce155
	9Ce160	9Ce164
	9Ce161	

SUMMARY
(Table 16)

	Favorable Soils	Unfavorable Soils
Prehistoric	14	8
Historic	8	7

TABLE 17. PREHISTORIC AND HISTORIC COMPONENTS ON FAVORABLE AND UNFAVORABLE SOILS USING 1958 TERRAIN ANALYSIS MAP

	Favorable Soils Site #'s	Unfavorable Soils Site #'s
Prehistoric	9Ce51	9Ce134
	9Ce93	9Ce138
	9Ce135	9Ce139
	9Ce136	9Ce151
	9Ce141	9Ce152
	9Ce143	9Ce156
	9Ce153	9Ce160
	9Ce154	9Ce166
	9Ce157	
	9Ce161	
	9Ce162	
	9Ce163	
	9Ce165	
Historic	9Ce137	9Ce145
	9Ce140	9Ce146
	9Ce142	9Ce149
	9Ce144	9Ce150
	9Ce147	9Ce155
	9Ce148	9Ce159
	9Ce160	9Ce164
	9Ce161	

SUMMARY
(Table 17)

	Favorable Soils	Unfavorable Soils
Prehistoric	14	8
Historic	8	7

EVALUATION OF NWR SITES IN RELATION TO RSA MODEL

Having critically evaluated the procedures implemented by RSA in variable evaluation for model development, we undertook a formal examination of our data in relation to the model. The preceding discussion made it clear that RSA's data appear reasonably sound, with most of the discrepancies related to mapping errors. If this is the case, then our sites should reflect placement within the probability zones in proportion to what we had hypothesized would be true if the model was applicable. To test this, we plotted our sites on RSA's probability map (Figure 22), finding very surprising results: far too many sites fell in low probability zones, too few in high probability zones (Table 18).

These unexpected frequencies of sites relative to probability zones can be explained in one of two ways. On the one hand, the disparity means that RSA's model cannot be applied to our project area. On the other hand, the problems with some of RSA's maps go beyond minor discrepancies between the use of the 1928 county soils maps and the more recent 1958 Terrain Analysis Maps.

To resolve these apparent disparities, we reviewed our site data in terms of RSA's variables and values. First, we used sepia copies of RSA's work maps and plotted our sites on them. For each variable on each site, a plus or minus rating was given according to RSA's model and the site's location on their work maps.

Second, for each site we reviewed the site forms, quadrangle and soils maps, slope maps and checked for streams to evaluate their rank. For example, when 9Ce134 was plotted on RSA's work maps, the slope variable received a minus rating when, in fact, it was situated on a slope of less than 10 percent. Since the other two variables for 9Ce134 are plus ratings, the corrections of this error shifts the site from a medium to a high probability rank. Each of our sites was reviewed in this manner with the results presented in Table 19. As is clear in the discussion of each site's rank, many of the site rankings should be altered.

After reviewing the variables and rankings for each site, we revised the probability rankings based on the actual favorable or unfavorable rating for each of the three variables. As a result, the number of sites that occur in what are, based on the variable combinations, high probability areas, increased dramatically at the expense of the lower probability zone. [Parenthetically, we point out that for two of the sites, 9Ce156 and 9Ce158, certain of the variable data were difficult to assess with confidence so we have left these as they would be ranked by RSA, but have so noted their questionability.] Table 20 shows the site frequencies for the revised probability ratings. These, now, are almost identical to the predictions based on the RSA model.

FIGURE 22. NWR SITES PLOTTED ON RSA'S PROBABILITY MAP.

TABLE 18. NWR COMPONENTS AS LOCATED ON THE RSA MAPS

	Probability		
	High	Medium	Low
Prehistoric Components			
	9Ce51 (H)	9Ce93	9Ce139
	9Ce135 (H,M,L)	9Ce134	9Ce151
	9Ce141	9Ce136	9Ce154
	9Ce143	9Ce138	9Ce156
	9Ce157 (H)	9Ce152	9Ce162
	9Ce160 (H,M)	9Ce165	9Ce163
	9Ce161 (H)	---	9Ce166
TOTALS:	7 (31.8%)	6 (27.3%)	9 (40.9%)
OVERALL TOTALS:	22		
Historic Components			
	9Ce142	9Ce137	9Ce140
	9Ce147	---	9Ce144
	---	9Ce159	9Ce145
	9Ce161 (H)	9Ce160 (M)	9Ce146
	---	---	9Ce148
	---	---	9Ce149
	---	---	9Ce150
	---	---	9Ce155
	---	---	9Ce164
TOTALS:	3 (20.0%)	3 (20.0%)	9 (60.0%)
OVERALL TOTALS:	15		

TABLE 19. PREHISTORIC SITES

Site	Water	Slope	Soil	RSA Rank	Rank Should Be
9Ce51	±	+	+ (Oy)	H,L	H

Comments: It is correct.

9Ce93	-	+	+ (Ns)	M	H

Comments: The distance to water is wrong. From the stream to the RSA 225 line is really only about 180 m. Thus, the rating which leads to a medium probability rating is incorrect. The rating here should be higher. Most of the site is less than 200 m from a stream.

9Ce134	+	-	+ (K)	M	H

Comments: The slope is incorrectly mapped by RSA. It is less than 10 percent. The other two variables are plus. The soil should be high.

9Ce135	±	±	± (Ns,Ss)	H,M,L	M

Comments: RSA's map has some of the area with rating for slope. This is wrong. No rating should be less M. The H is not really more desirable than the rest of site area. The whole area should probably be medium.

9Ce136	-	+	+ (Oy)	M	H

Comments: RSA's map is wrong for the distance to water. An intermittent stream is shown on the map only 160 m away. They omitted the stream. It should be high zone.

TABLE 19. PREHISTORIC SITES
(continued)

Site	Water	Slope	Soil	RSA Rank	Rank Should Be
9Ce138	+	-	+ (Ns)	M,L	H

Comment: RSA's map is wrong. This site is on a ridge nose, so slope should be rated plus, thus, making the area high probability.

Site	Water	Slope	Soil	RSA Rank	Rank Should Be
9Ce139	-	+	- (N)	L	M

Comments: Either there is map distortion or RSA's maps are wrong. The map has our plotting greater than 225 m from the water. We measured on quad and have it only 160 m from the water. Thus, there should be a plus rating for slope and water resulting in an M rating for site.

Site	Water	Slope	Soil	RSA Rank	Rank Should Be
9Ce141	+	+	+ (Ns)	H	H

Comments: It is correct: H ranking on ridge crest side.

Site	Water	Slope	Soil	RSA Rank	Rank Should Be
9Ce143	+	+	+ (Ns)	H	H

Comments: This is correct: ridge crest side.

Site	Water	Slope	Soil	RSA Rank	Rank Should Be
9Ce151	+	+	+ (Ns)	H	H

Comments: The rating is correct: terrace over Hollis Creek.

Site	Water	Slope	Soil	RSA Rank	Rank Should Be
9Ce152	+	+	- (Rl)	M	M

Comments: The rating is correct; our mapping is off a bit, possibly due to distortions.

TABLE 19. PREHISTORIC SITES
(continued)

Site	Water	Slope	Soil	RSA Rank	Rank Should Be
9Ce153	+ (but on border)	-	- (N)	L	M

Comments: RSA's map is wrong for water. 9Ce153 is less than 200 m from Hollis Creek. At this point, they have the 225 m line drawn only about 170 m from Hollis Creek. The ranking should definitely, therefore, be plus. Also, the map of the slope is true in following slope, but the distortion, or whatever, has it off slightly. So, in reality, the M zone where 9Ce152 is should also encompass 9Ce153.

Site	Water	Slope	Soil	RSA Rank	Rank Should Be
9Ce154	+	+	+ (Nl)	L	H

Comments: This is our error. The site should be located a hair to the west and within the H zone.

Site	Water	Slope	Soil	RSA Rank	Rank Should Be
9Ce156	-	+	- (Rs)	L	L(?)

Comments: Our data are insufficient.

Site	Water	Slope	Soil	RSA Rank	Rank Should Be
9Ce157	+	+	+ (Ns)	H,L	H

Comments: This is the correct rating. The site is on terrace of Hollis Creek.

Site	Water	Slope	Soil	RSA Rank	Rank Should Be
9Ce158	-		+ (Ns)	L	L(?)

Comments: Our data are insufficient.

TABLE 19. PREHISTORIC SITES
(continued)

Site	Water	Slope	Soil	RSA Rank	Rank Should Be
9Ce160	+	±	+ (Ns) - (Rg)	H,M,L	H

Comments: This rating appears correct. Should go with high even though it cross-cuts both favorable and unfavorable soil associations.

Site	Water	Slope	Soil	RSA Rank	Rank Should Be
9Ce161	+	+	+ (Ns)	H,L	H

Comments: The site is entirely within the H zone. The overlap into low is on the steep slope down to the stream and into another soil zone. A problem with the low probability zone to the north is that RSA missed a stream (it does not show as intermittent and so was not in their definition). Actually, the area to the north is not low. So, use H ranking.

Site	Water	Slope	Soil	RSA Rank	Rank Should Be
9Ce162			+ (Ns)	L	L

Comments: The rank is correct for the variables. The site is 50 m from water and on a slope greater than 90 percent.

Site	Water	Slope	Soil	RSA Rank	Rank Should Be
9Ce163	-	+	+ (Oy)	L	H

Comments: The RSA map is incorrect. The water rank is in error; it should be plus (move site slightly to north). Also, RSA failed to indicate a medium probability zone which is where the site should be according to their variables. RSA also failed to plot a high probability zone (including the site area) which exists here based on the variables.

TABLE 19. PREHISTORIC SITES
(continued)

Site	Water	Slope	Soil	RSA Rank	Rank Should Be
9Ce165	- (>225)	+	+ (Ns)	M	M

Comments: The ranking seems correct.

Site	Water	Slope	Soil	RSA Rank	Rank Should Be
9Ce166	- (>225)	-	- (Rs)	L	M

Comments: It is on the border of the M zone; it's distance to water is 225 m. RSA's map is off slightly; it should be in a M zone.

TABLE 20. REVISED PROBABILITY RATINGS FOR PREHISTORIC SITES

High	Medium	Low
9Ce51	9Ce135	9Ce156(?)
9Ce93	9Ce139	9Ce158(?)
9Ce134	9Ce152	9Ce162
9Ce136	9Ce153	
9Ce138	9Ce165	
9Ce141	9Ce166	
9Ce143		
9Ce151		
9Ce154		
9Ce157		
9Ce160		
9Ce161		
9Ce163		
13	6	3

Discussion of Model Applicability

We can conclude from this discussion that RSA's model is basically sound in the sense that the three variables (soil, slope, distance to nearest stream) and the ratings assigned to the values do have predictive value. Where three favorable (+) ratings for each of the variables combine, a high probability exists for prehistoric site location. Where only two of the variables are favorable, there will be a medium probability for finding prehistoric sites and in areas with less than two favorable ratings, site probability is low.

The model has, therefore, been tested and its applicability accepted. This is important for cultural resource management since our evaluation confirms applicability even where differences (such as those demonstrated between our survey tract and that of RSA) occur in areal composition.

In implementing the model as a management tool, however, consideration must be given to the potential for discrepancies in the probability map. The problems which arise with using the map do not stem from inaccuracies, but rather from difficulties in portraying subtle variations in combinations of variables on a small-scale

illustration. What seemed initially to be dramatic disagreement between our site locations and RSA's probability zones was, subsequently, determined to be the result of either this difficulty in illustrating variation or differences in map interpretations.

Specifically, three problem areas can be pointed out. First, there will be some discrepancies in slope measurement. For example, RSA would draw the 10 percent slope line in one place, and we would find a site just outside the line, but on a less than 10 percent slope. This is a matter of map interpretation and field checking. It is, of course, compounded by not knowing and really being able to evaluate RSA's slope designations.

Second, in considering distance to water, we found that the 75 m and 225 m lines are off by 25 m to 40 m, a difference that could easily affect probability rankings.

Third, the elimination from the map of streams less than 500 m long can lead to spurious assumptions on site probability. In areas along such streams where there would be favorable ratings for soil and slope, the actual ranking should be high, but it will not be depicted as such on the map.

Finally, although our data showed no change in total site frequencies relative to probability zones when comparing the 1928 soils map and the 1958 Terrain Analysis Map, we did see a shift in five of the individual site rankings. The fact that there are some differences between the two maps may not be of great consequence, but, as we pointed out earlier, it should be kept in mind for planning.

Many of these factors relate to the necessity of field verification which, for an area the size of Fort Benning, is not generally accommodated by modelling projects. Although some of the problems could create errors in management we did not feel that the effort expended by RSA should be downplayed. Instead, we considered that adjustments might be made in their probability zones to correct the mapping errors for the 22,000 ac maneuver area. However, prior to making these adjustments we wanted to explore the possibility that factors other than on-site variables might have had an influence in site locations.

In other words, what is the potential for a site to be located not solely because of the immediate site characteristics, but those of the vicinity as well? If we can account for site location by evaluating a catchment area around the site, differences between non-sites and prehistoric and historic sites may be distinguished and the predictive power of the model enhanced even further. Following our tests and evaluation of RSA's model, we pursued just such an approach, the procedures and results of which are presented in the next chapter.

CHAPTER SEVEN

STATISTICAL TEST OF SITE LOCATION

From RSA's model, we have some understanding as to which variables were considered by prehistoric residents; however, deciding where to place a site was probably more involved than simply looking at one or two environmental attributes. Not only were more variables involved, but also the decision likely took into account complex inter-relationships between these variables which simply cannot be intuitively perceived.

As noted in the previous section, the main problem with RSA's model has little to do with the predictive variables chosen. Individually, each of the variables was highly significant. But RSA had no way of determining how important each variable was or how the variables were inter-related. In their model, all variables are treated as equals. Thus, the model may have shortcomings that are unrelated to their scale of resolution or other mapping problems, but that result from an inability to deal with the overall complexities of locational behavior.

To examine patterns of site location, we need to use procedures that reduce the information carried by each environmental attribute to a small set of 'composite' variables capturing the underlying structure of the entire data set. Procedures of this type fall under the rubric of multivariate statistics. The method we have chosen for the Fort Benning data is discriminant analysis.

BASIS OF DISCRIMINANT ANALYSIS

In contrast to hierarchical clustering procedures, which derive groups of cases (Q-mode) or variables (R-mode) from the input data, discriminant analysis begins with predefined groups of cases. Each case is scored on a number of variables (here, the presence or absence of a specific environmental attribute) and weights for the variables are derived so as to maximally discriminate between the groups. The analysis leads to discriminant functions, each of which is a linear function of the input variables and represents one dimension of the data. Each function provides a distance scale, orthogonal to all others, and cases can be plotted as points in the N-dimensional space defined by the N discriminant functions. Groups of cases having the greatest similarity will be closest together; while the two groups having the least in common on any dimension will be at opposite ends of the corresponding scale.

The analysis also furnishes insight into relations among variables. Each discriminant function is uncorrelated with (orthogonal to) all the others, and one can determine which input variables correlates most highly with a given function. Pearson correlation coefficients are often used, since the discriminant analysis model is linear (Cowgill et al. *n.d.*:71). However, one can also use the standardized discriminant function coefficients, which basically are the weights of each discriminating variable on a particular function. Because these coefficients are standardized, they all have means of zero and standard deviations of 1. The larger the coefficient score, the greater its discriminating weight. The sign of the coefficient indicates the direction of the relationship (i.e. a positive sign means that a higher score on the variable corresponds to a higher score on the discriminant function, while a negative score means the reverse).

Besides the assumption that the groups can be well separated by linear functions of the original variables (i.e., that non-linear relationships are unimportant), two other assumptions are that the variables have a multivariate normal distribution and that they have equal variance/covariance matrices within each group. In practice, discriminant analysis is very robust, so that assumptions regarding variable distributions and variance/covariance matrices "need not be strongly adhered to" (Klecka 1975:435).

Each discriminant function is interpreted by 1) seeing how the groups of cases score on it; and 2) examining the correlation with each variable to determine how much (or how little) each variable contributes to differentiating the groups.

Discriminant analysis can also be used as a classification tool. After the discriminant functions are computed the original cases are reassigned to input groups, solely on the basis of their discriminant function scores. If a case is reassigned to its original input group, it is scored as a 'hit.' Whether the observed proportion of hits is

satisfactorily high is essentially a pragmatic question: it depends on what we hope for from the analysis. Too low a proportion of hits could be due to various reasons: initial groups which are badly chosen or not really very different; variables which are not very relevant for distinguishing between the groups; or serious violations of some of the assumptions of the mathematical model. On the other hand, a high proportion of hits is very reassuring, at least if the number of cases is much larger than the number of variables, since, even if one is uneasy about how well the real data conform to the mathematical model, one must be 'doing something right' in order to get a high proportion of hits. If there were not many more cases than variables, one might be 'capitalizing on chance,' but this becomes very improbable if there are several times as many cases as variables.

The use of reclassification alone as a test of discriminatory power, however, can be misleading (Frank et al. 1965, Morrison 1969). Discriminant analysis is geared to maximize the separation between the groups for the particular sample being studied. That is, the technique provides the best solution that will reclassify the highest proportion of these cases to their pre-assigned groups. The result is biased and tends to inflate the power of the discriminators. This bias is due to sampling errors and is reduced as sample sizes are increased.

The best approach to overcome this bias is to incorporate some type of validation procedure within the discriminant analysis. For example, we could have split our samples of sites and non-sites each into two groups. The first set of sites and non-sites could be used to derive the discriminant function. The second set of sites and non-sites could be entered into the analysis as "unknown groups" and assigned to site or non-site groups solely on the basis of their discriminant scores. The proportion of "unknown group" cases classified correctly then would be compared with the proportion of the original cases correctly reclassified.

Another approach to validating the results would be to use simulated synthetic data, randomized so that no significant differences exist between the "analysis" population (i.e., the actual field results) and the synthetic one. Here, the discriminant functions are determined by the analysis sample. The synthetic cases are then classified by the discriminant functions. Since these cases have been drawn to ensure that the expected discriminatory power of the analysis is zero, any discriminatory power found in the resulting classification table can be interpreted as the measure of the bias associated with the given degrees of freedom (see Frank et al. 1965:254-255 for an expanded discussion of this topic).

While we understand the problems associated with the inherent upward bias of discriminant analysis, we have not included a validation procedure in our analysis. This decision is based in part on the small number of sites found (thereby precluding splitting the sample) and the rather complex procedures involved in developing a synthetic

data set. The power of our discriminant model, therefore, maybe somewhat inflated; however, we feel this problem does not vitiate the analysis.

The discriminant analysis of the Fort Benning data was designed to examine two separate, though related, issues. First, we wanted to determine whether site locations were patterned; that is, whether we could characterize those areas favored by prehistoric and historic residents on the basis of a set or sets of co-occurring environmental variables as opposed to those areas not favored. Second, we wanted to see whether prehistoric site locations could be distinguished from historic ones.

STATISTICAL PROCEDURES

Cases and Variables

Seventy-seven cases were used in the analysis. These included all 22 prehistoric components and 15 historic components found in the project area. [During the coding of the variables, one historic site, 9Ce155, was mis-coded. Thus, in the discriminant analysis, we had 23 sites coded prehistoric and 14 coded historic. This error did not greatly affect the results.] In addition, 40, out of a total of 128, non-site locations (i.e., locations field surveyed and found not to contain sites) were selected through a simple random sampling technique. The number of non-site locations (40) was chosen to yield roughly equal groups of sites and non-sites.

Variables were constructed representing ten basic environmental features. Four of these represent site-specific attributes; these include slope, distance to water, site-specific soil type and landform. A fifth variable, termed relative elevation, was designed to measure whether cases were situated in well-drained or poorly-drained locales. This variable was measured by determining the elevations at the center of the site and at points 100 m from the center in each of the cardinal directions (elevations were determined from the U.S.G.S. 7.5 minute topographic maps). If the center point was higher than an off-site elevation, a +1 was scored, while the reverse situation scored a -1. No difference in elevation between the points was scored as a zero. Thus, if a site or non-site point was located on a hilltop, it scored a +4; whereas, a point located in a depression scored a -4.

The remaining five variables were designed to capture the environmental nature of the immediately surrounding catchment area. The concept of site catchment was introduced in 1970 by Claudio Vita-Finzi and Eric Higgs as "the study of the relationship between technology and those natural resources lying within economic range of individual sites" (Vita-Finzi and Higgs 1970:5). The basic assumption is that the further away an area is from the habitation site, the less likely it is to be exploited. The natural follow-up to this assumption is

that sites will tend to be located in areas which offer the maximum access to resources with the minimum expenditure of time and effort.

This argument was raised by Gumerman et al. (1971) in which they suggest that sites were located so as to minimize travel time in acquiring off-site resources. During the 1970s, catchment analysis was taken up by a number of researchers such as Flannery, Rossman and Zarky (Flannery ed. 1976) in which they addressed the problems of catchment studies in trying to evaluate on-site resources as well as those resources obtainable within a reasonable distance from the site. In 1978, Thomas and Campbell (1978) followed the lead of Vita-Finzi and Higgs in defining a catchment zone around a multi-component site on Little River in central Louisiana. In their study, they isolated some of the variables apparently influential in prehistoric occupants selecting that locale. Additionally, they identified other areas along Little River that presented similar favorable environments for hunters-fishers-gatherers as well as groups engaged in limited horticultural activity.

All of the previous work on catchment zone analysis underscore the importance of looking not only at immediate on-site characteristics, but the range and ease of access to other environmental variables from the immediate site area. Although many predictive models of site location consider such factors as distance to nearest water, distance to certain soil types, etc., we wanted to employ some method of standard measurement of variables that might be considered within a catchment zone of even a small, temporarily occupied site.

At Fort Benning, this area was defined as a circle with a radius of 225 m whose midpoint was the center of the site (Figure 23). A radius of 225 m was chosen following RSA's finding that most sites (66.6 percent) are found within this distance from water. The catchment variables included the number of streams within this zone, the number of soil types, the dominant soil type (i.e., the soil type covering the largest percentage of the zone), the dominant vegetative community (i.e., the vegetative community covering the largest percentage of the zone) and the number of vegetative communities. In all, the variable set was designed to determine whether the distinguishing characteristics of site location had more to do with the specific locale, the surrounding area or a combination of the two.

Although this procedure was followed for all sites, in several cases, an arbitrary point was selected around which the 225 m radius was measured. These exceptions were large, elongated sites at which a circle around the exact centerpoint would have not captured the actual number of streams within 225 m. To provide a true picture of proximity to water sources, the circle was drawn around a point from which the maximum number of streams were included in the 225 m area.

Each variable was divided into a number of mutually exclusive categories. With the exception of slope, relative elevation and distance to water, the categories consisted of all possible states of

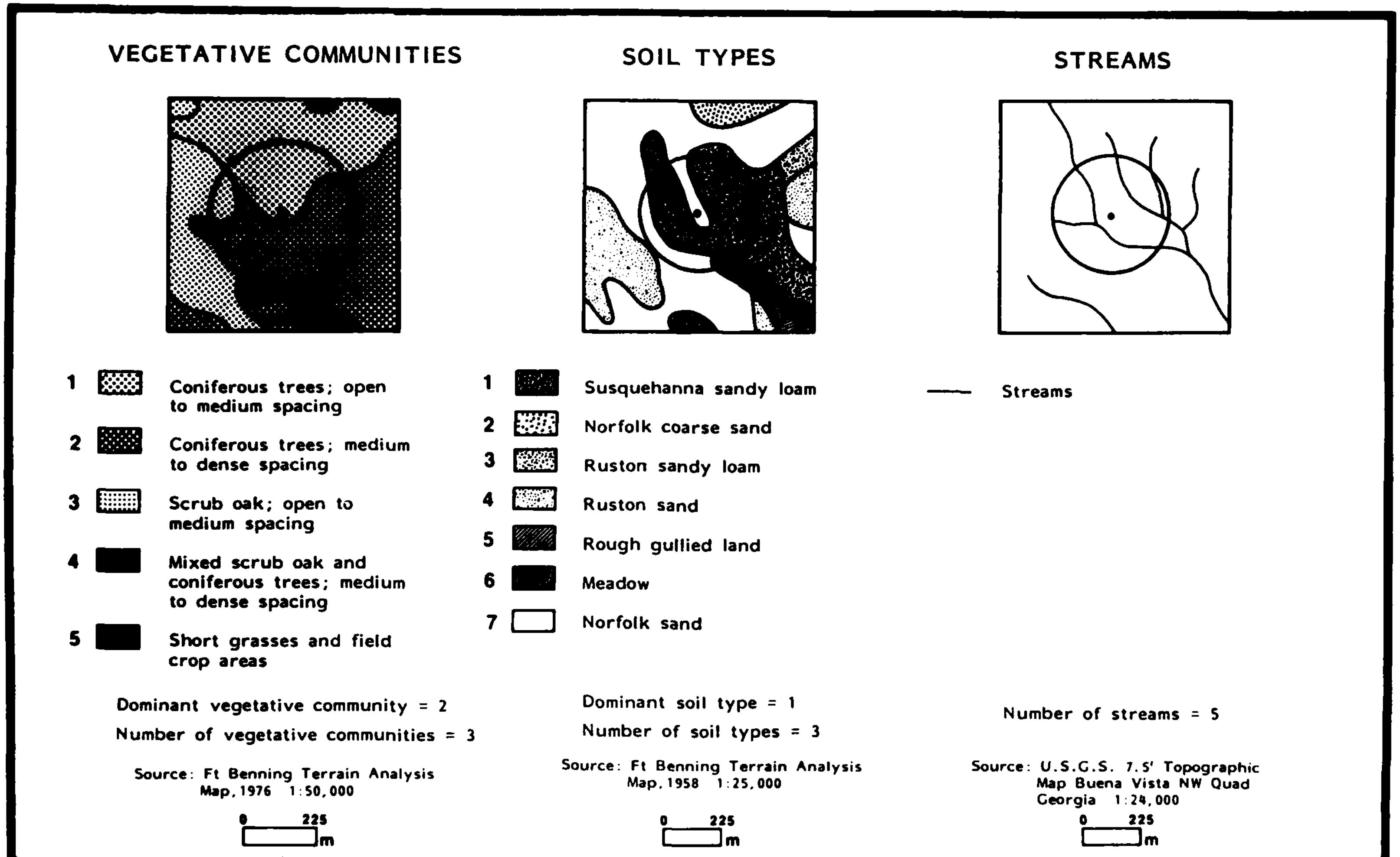

FIGURE 23. EXAMPLE OF CATCHMENT VARIABLES FOR 9Ce141.

NWR

each particular variable. The former three variables were originally measured on interval or ordinal scales. The scores of these variables were then grouped into three or four mutually exclusive categories, on the basis of theoretical or statistical concerns (i.e., to alleviate skewed data distributions). For example, slope was divided into three possible states: sites and non-site points situated on slopes between zero percent and ten percent; 11 percent and 25 percent; and greater than 25 percent.

For purposes of the discriminant analysis, each category was considered a separate variable. Each category received a score of 1 if the environmental attribute was present and a 0 if absent. In the example using slope, a site located on a flat surface would score a 1 for the zero percent to ten percent variable, a 0 for the 11 percent to 25 percent variable and another 0 for the greater than 25 percent variable. Thus, all variables used in the discriminant analysis were dummy variables.

For each site or non-site location, 81 dummy variables were coded. Table 21 lists the ten major environmental variables, the appropriate dummy variables for each as well as the mnemonic used during the computer run (actual computer printout submitted to ASB under separate cover). Also included on Table 21 is the source and measurement of each variable.

Of the 81 variables, 53 were actually used as input to the discriminant analysis. Seven variables were eliminated due to duplication. Three of these related to distance to water and four referred to the number of vegetative communities within 225 m. Originally, we coded two sets of distance to water variables; one reflecting a four-fold division developed on the basis of a tri-modal histogram of the sites in the present project area and a second indicative of the three-fold division defined by RSA.

Seven additional variables were deleted because they were absent on all cases. Two of these variables were greater than five streams present within 225 m (Stream7) and seven soil types present within 225 m. The remaining five variables all related to dominant vegetative communities within 225 m and included open to medium spaced deciduous forest (Veg3), open to medium spaced mixed scrub oak and coniferous forests (Veg5), open to medium spaced mixed scrub oak and coniferous forests (Veg9), swamps (Veg12) and marsh (Veg13). Finally, 14 soil type variables were dropped. In this case, if none of the 77 points was located on a specific soil type, then the corresponding dominant soil type variable was also deleted and vice-versa. In no case was the corresponding variables, whether site-specific or dominant soil type, represented by more than three cases.

The Pearson's r correlation coefficients between the seven dummy variables representing distance to water show that all the variables are highly inter-correlated, indicating that regardless of which scheme is used, the results would not be drastically affected. The

TABLE 21. VARIABLES, DUMMY VARIABLES AND MNEMONICS USED IN STATISTICAL MANIPULATION OF FORT BENNING SITE AND NON-SITE POINT DATA

Environmental Feature	Dummy Variable	Mnemonic	Measure/Source
Slope	0 - 10%	SLOPE1	Field Judgement
	11 - 25%	SLOPE2	and slope indicator
	> 25%	SLOPE3	off quad map
Distance To Nearest Stream	0 - 30 m	WATER1	Measured from
	31 - 110 m	WATER2	quad map
	111 - 225 m	WATER3	
	> 225 m	WATER4	
	0 - 75 m	HT001	Measured from
	76 - 225 m	HT002	quad map, but
	> 225 m	HT003	not used
Number Of Streams Within 225 m	0	STREAM1	Measured from
	1	STREAM2	quad map
	2	STREAM3	
	3	STREAM4	
	4	STREAM5	
	5	STREAM6	
	> 5	STREAM7	
Relative Elevation	+3 - +4	ELEV1	Measured from
	+1 - +2	ELEV2	quad map
	-4 - 0	ELEV3	
Number of Soil Types Within 225 m	1	NSOIL1	Measured from
	2	NSOIL2	1958 Terrain
	3	NSOIL3	Analysis Map
	4	NSOIL4	
	5	NSOIL5	
	6	NSOIL6	
	7	NSOIL7	

TABLE 21.
(continued)

Environmental Feature	Dummy Variable	Mnemonic	Measurement/Source
Dominant Soil Type Within 225 m (i.e., soil type covering largest percentage of catchment zone)	(Lns)	DSOIL1	Measured from 1958 Terrain Analysis Map
	(L)	DSOIL2	
	(Se)	DSOIL3	
	(Ss)	DSOIL4	
	(E)	DSOIL5	
	(Es)	DSOIL6	
	(Nl)	DSOIL7	
	(M)	DSOIL8	
	(Ks)	DSOIL9	
	(H)	DSOIL10	
	(Rl)	DSOIL11	
	(Rg)	DSOIL12	
	(Ol)	DSOIL13	
	(Oy)	DSOIL14	
Site-Specific Soil Type	(Lns)	SSOIL1	Measured from 1958 Terrain Analysis Map
	(L)	SSOIL2	
	(Se)	SSOIL3	
	(Ss)	SSOIL4	
	(E)	SSOIL5	
	(Es)	SSOIL6	
	(Nl)	SSOIL7	
	(M)	SSOIL8	
	(Ks)	SSOIL9	
	(H)	SSOIL10	
	(Rl)	SSOIL11	
	(Rg)	SSOIL12	
	(Ol)	SSOIL13	
	(Oy)	SSOIL14	
Dominant Vegetative Community Within 225 Meters (i.e., vegetative community covering largest percentage of catchment zone)	Coniferous forest - open to medium	VEG1	Measured from 1958 Terrain Analysis Map
	Coniferous forest - medium to dense	VEG2	

TABLE 21.
(continued)

Environmental Feature	Dummy Variable	Mnemonic	Measurement/Source
Dominant Vegetative Community Within 225 m [continued]	Deciduous forest: open to medium	VEG3	Measured from 1958 Terrain Analysis Map
	Deciduous forest: medium to dense	VEG4	
	Mixed coniferous/ deciduous forest: open to medium	VEG5	
	Mixed coniferous/ deciduous forest: medium to dense	VEG6	
	Scrub oak forest: open to medium	VEG7	
	Scrub oak forest: medium to dense	VEG8	
	Mixed scrub oak/coniferous forest: open to medium	VEG9	
	Mixed scrub oak/coniferous forest: medium to dense	VEG10	

TABLE 21.
(continued)

Environmental Feature	Dummy Variable	Mnemonic	Measurement/Source
Dominant Vegetative Community Within 225 m [continued]	Short grass	VEG11	Measured from 1958 Terrain Analysis Map
	Swamps	VEG12	
	Marsh	VEG13	
Number of Vegetative Communities Within 225 m	1	DVEG1	Measured from 1958 Terrain Analysis Map
	2	DVEG2	
	3	DVEG3	
	4 (ungrouped)	DVEG4	
Number of Vegetative Communities With Veg1 and Veg2, Veg7 and Veg8 combined			Measured from 1958 Terrain Analysis Map (Not Used)
	1	NVEG1	
	2	NVEG2	
	3	NVEG3	
	4	NVEG4	
Landform	Floodplain	LAND1	Measured from Quad Map
	Ridge Slope	LAND2	
	Ridge Crest	LAND3	
	Ridge Nose	LAND4	
	First Terrace	LAND5	

same conclusion applies to the two sets of variables measuring the number of vegetative communities within 225 m. The only difference between these sets is that in the first each vegetative community counted equally, whereas in the second all coniferous forests and all scrub oak forests were combined regardless of spacing. While the second set of vegetative variables may be more appropriate for an examination of prehistoric site location, the correlation matrix strongly suggests that the results would be the same whichever variable set was used.

RESULTS

The discriminant analysis was computed using the Statistical Package for the Social Sciences (SPSS) version 8.0 DISCRIMINANT subprogram at the University of Arizona's computer center. A stepwise procedure was selected which maximized Rao's V, a generalized distance measure. Rao's V was selected over other stepwise criteria because the generated results are fairly easy to interpret. Basically, this statistic is designed to yield the greatest separation between groups. Thus, the graph plotting of the distribution of groups on the first two discriminant scores can be taken as a true indication of their position vis-a-vis other groups. Most other stepwise criteria focus on the two most similar groups. These statistics produce greater differentiation among these groups but in so doing have differing affects on outside groups. These differing affects are not easily grasped intuitively and so make the interpretation of the results more difficult. In practice, the differences between the selection criteria are usually not great enough to obscure "strong" patterns in the data. We have used Rao's V successfully in the past and find the results the easiest to interpret (Cowgill et al. n.d.).

The analysis produced two significant discriminant functions; the maximum possible using three groups. The first function accounted for 88.9 percent of the total sample variance, while the second accounted for the remaining 11.1 percent (see Tatsvoka 1970:48). Thus, the first function is roughly eight times more important in distinguishing groups than the second function.

Figure 24 is a scatter plot of the discriminant scores on the two functions for each of the 77 cases. The plot shows that the first discriminant functions (the X-axis) distinguishes non-site locations (negative end of the function) from all site locations (positive). The statistically less important second function, then, separates prehistoric sites (negative) from historic ones (positive).

While 53 variables were used as input for the discriminant analysis, only 31 were actually needed to obtain the maximum discrimination between the groups. To a large extent, this result is an indication of the high degree of inter-correlation between many of the environmental attributes. Table 22 presents the Pearson r correlation coefficients and the consequent r^2's for those variables in which the

DISCRIMINANT ANALYSIS OF SITE VS. NON-SITE LOCATIONS, FT BENNING, GEORGIA

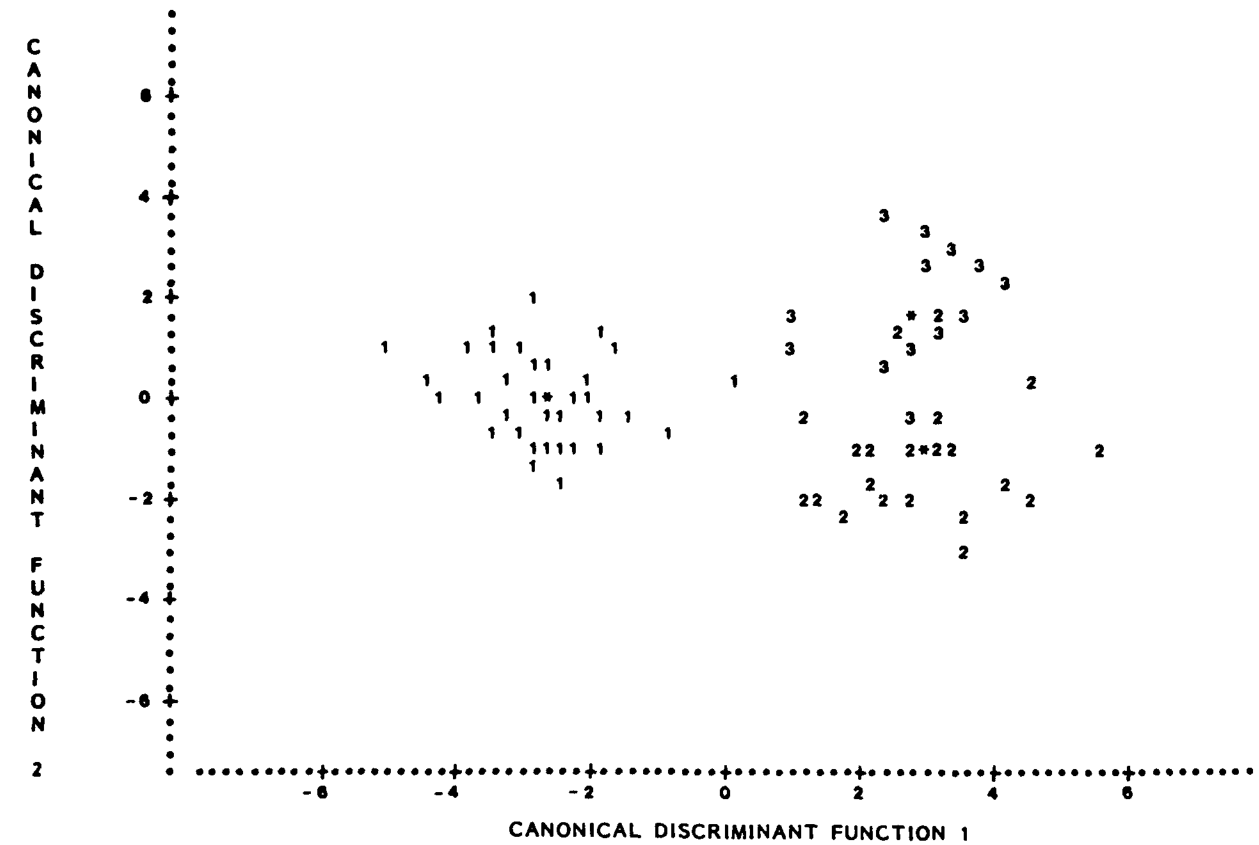

FIGURE 24. SCATTER PLOT OF SITE AND NON-SITE LOCATIONS ON FIRST TWO DISCRIMINANT FUNCTIONS.

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* Group centroid
1 Non-site points
2 Prehistoric sites
3 Historic sites

proportion of one of the variable's variance captured by the other is greater than 20 percent (i.e., R^2 x 100).

TABLE 22. PEARSON r CORRELATION COEFFICIENTS

Variable Pair (mnemonics)	R	R^2
Streaml - Nsoil2	.49	.24
Streaml - Veg7	.47	.22
Streaml - Vegll	.47	.22
Waterl - Ssoil18	.50	.25
Ssoil6 - Ssoil2	.53	.29
Dsoil2 - Dveg4	.46	.21
Dsoil8 - land5	.47	.22
Dsoil9 - landl	.61	.37
Dsoil6 - Veg8	.57	.32
Ssoil15 - Veg8	-.45	.20
Ssoil17 - land5	.52	.27
Ssoil18 - landl	.49	.24
Ssoil19 - landl	.49	.24

In general, the correlation results indicate that the absence of streams in a 225 m area is strongly linked with the lack of soil diversity and specific vegetative types (especially coniferous and scrub oak forests). Various soil types (both site-specific and dominant in the catchment area) are correlated with landforms and less so with vegetative communities.

Given the high degree of inter-correlation among some of the variables, it is not surprising that only 31 variables were needed to complete the analysis. One must remember, however, that simply because a variable was not included in the analysis does not mean that the corresponding environmental attribute was insignificant in decisions regarding locational behavior. For instance, different landforms are one of the main features characterizing each group. Yet, with the exception of ridge crests (Land3), no landform variable was included in the discriminant analysis and even ridge crest was not a strong discriminator.

Because the high degree of inter-correlation suggests that some important site location variables may not have entered the analysis, examining the standardized discriminant weights of only those variables that were included is not a productive way of interpreting the results. Instead, we have found that a simple table of mean

values and standard deviations of all variables for each group is not only relatively easier, but also more informative. Tables 23 and 24 summarize these data for the three Fort Benning groups. One should bear in mind that the means in this case are restricted to fall between zero and one. Consequently, a high mean score indicates that most of the cases in that group have the particular variable present while a low score indicates absence.

In general, the following can be said about each group. Non-site locations are a relatively heterogeneous group. Standard deviations range from about 0.2 to 0.5 and in only two cases (relative elevation 0 to -4 and ridge slope or ridge crest) are the standard deviations small relative to the mean. Non-site locations are characterized by poor drainage and are usually found on ridge slopes in medium to densely spaced scrub oak forests. They are not situated near ecotones and are associated with either zero or one stream within 225 m.

Prehistoric sites were located on flat, well-drained surfaces primarily on ridge noses or first terraces. Sites were located in ecotone situations with between four and six soil types and three or four streams found within 225 m. Predominant soils in the catchment area were either Norfolk coarse sand (1928 Soils Map; 1958 Soils Map classifies as Lakeland coarse sand [L]) or Meadow (designation [M] on both 1928 and 1958 Soils Maps), with sites being located specifically on Norfolk sand or coarse sand. Vegetative cover consisted primarily of either medium to densely spaced coniferous or deciduous forests.

Historic sites were also situated on well-drained, flat surfaces. Unlike prehistoric sites, historic ones were not found on ecotones, being located primarily on ridge crests. Many of these sites were found on and in areas dominated by Ruston sandy loam. Some historic sites were located far from water (over 225 m), while others were located on water. Preferred locations seem to be in open vegetative cover consisting primarily of either coniferous or mixed scrub oak/coniferous forests.

The major distinctions between site and non-site locations seem to focus on specific environmental attributes of the immediate locale. Preferred site locations were well-drained, flat surfaces. Topographically, these locales cluster on ridge noses, ridge crests and first terraces where coniferous forests predominate. In contrast, prehistoric sites are distinguished from historic ones primarily on the basis of catchment variables. Prehistoric sites show a proclivity for ecotonal situations, reflected in consistently higher mean scores for virtually every catchment variable. Historic sites are a rather diverse group and may actually be better represented as two separate sets of sites. One set appears to reflect activities associated with riverine activities, such as dams, while the other is composed of homesteads with their own wells (thus, no need to be located near water).

TABLE 23. DISCRIMINANT ANALYSIS OF SITE VS. NON-SITE LOCATIONS

Group Means and Standard Deviations (in parenthesis)

Variable	Mnemonic	Non-Site Locations	Prehistoric Sites	Historic Sites
Slope:				
0 - 10%	SLOPE1	.425 (.500)	.913 (.288)	1.00 (0.00)
11 - 25%	SLOPE2	.375 (.490)	.087 (.288)	0.00 (0.00)
> 25%	SLOPE3	.200 (.405)	.000 (.000)	0.00 (0.00)
Distance To Nearest Stream:				
0 - 30 meters	WATER1	.125 (.335)	.174 (.388)	.143 (.363)
31 - 110 meters	WATER2	.400 (.496)	.348 (.487)	.214 (.426)
111 - 225 meters	WATER3	.325 (.474)	.304 (.470)	.357 (.497)
> 225 meters	WATER4	.150 (.362)	.174 (.388)	.286 (.469)
Number of Streams Within 225 Meters:				
0	STREAM1	.275 (.452)	.130 (.344)	.000 (.000)
1	STREAM2	.350 (.483)	.000 (.000)	.143 (.363)
2	STREAM3	.200 (.405)	.261 (.449)	.357 (.497)
3	STREAM4	.175 (.385)	.217 (.422)	.143 (.363)
4	STREAM5	.000 (.000)	.348 (.487)	.286 (.469)
5	STREAM6	.000 (.000)	.043 (.209)	.071 (.267)
>5	STREAM7	.000 (.000)	.000 (.000)	.000 (.000)
Relative Elevation:				
3 to 4	ELEV1	.000 (.000)	.174 (.388)	.357 (.497)
1 to 2	ELEV2	.350 (.483)	.696 (.470)	.500 (.519)
0 to -4	ELEV3	.650 (.483)	.130 (.344)	.143 (.363)

TABLE 23. DISCRIMINANT ANALYSIS OF
SITE VS. NON-SITE LOCATIONS
(continued)

Group Means and Standard Deviations (in parenthesis)

Variable	Mnemonic	Non-Site Locations	Prehistoric Sites	Historic Sites
Number of Soil Types Within 225 Meters				
1	NSOIL1	.075 (.267)	.000 (.000)	.000 (.000)
2	NSOIL2	.150 (.362)	.043 (.209)	.071 (.267)
3	NSOIL3	.275 (.452)	.261 (.449)	.500 (.519)
4	NSOIL4	.225 (.423)	.304 (.470)	.286 (.469)
5	NSOIL5	.200 (.405)	.261 (.449)	.071 (.267)
6	NSOIL6	.075 (.267)	.130 (.344)	.071 (.267)
7	NSOIL7	.000 (.000).	.000 (.000)	.000 (.000)
Dominant Soil Type Within 225 Meters				
Lns	DSOIL1	.575 (.501)	.348 (.487)	.571 (.514)
L	DSOIL2	.075 (.267)	.174 (.388)	.000 (.000)
Sc	DSOIL3	.000 (.000)	.000 (.000)	.000 (.000)
Ss	DSOIL4	.150 (.362)	.130 (.344)	.143 (.363)
E	DSOIL5	.000 (.000)	.000 (.000)	.000 (.000)
Es	DSOIL6	.025 (.158)	.087 (.288)	.071 (.267)
Nl	DSOIL7	.000 (.000)	.000 (.000)	.000 (.000)
M	DSOIL8	.050 (.221)	.174 (.388)	.000 (.000)
Ks	DSOIL9	.050 (.221)	.000 (.000)	.000 (.000)
H	DSOIL10	.000 (.000)	.000 (.000)	.000 (.000)
Rl	DSOIL11	.050 (.221)	.087 (.288)	.214 (.426)
Rg	DSOIL12	.000 (.000)	.000 (.000)	.000 (.000)
Ol	DSOIL13	.025 (.158)	.000 (.000)	.000 (.000)
Oy	DSOIL14	.000 (.000)	.000 (.000)	.000 (.000)

TABLE 23. DISCRIMINANT ANALYSIS OF
SITE VS. NON-SITE LOCATIONS
(continued)

Group Means and Standard Deviations (in parenthesis)

Variable	Mnemonic	Non-Site Locations	Prehistoric Sites	Historic Sites
Site-Specific Soil Type				
Lns	SSOIL1	.475 (.506)	.435 (.507)	.357 (.497)
L	SSOIL2	.100 (.304)	.087 (.288)	.000 (.000)
Se	SSOIL3	.000 (.000)	.000 (.000)	.000 (.000)
Ss	SSOIL4	.075 (.267)	.087 (.288)	.143 (.363)
E	SSOIL5	.000 (.000)	.000 (.000)	.071 (.267)
Es	SSOIL6	.125 (.335)	.130 (.344)	.214 (.426)
Nl	SSOIL7	.025 (.158)	.087 (.288)	.000 (.000)
M	SSOIL8	.050 (.221)	.043 (.209)	.000 (.000)
Ks	SSOIL9	.050 (.221)	.043 (.209)	.000 (.000)
H	SSOIL10	.000 (.000)	.043 (.209)	.000 (.000)
Rl	SSOIL11	.025 (.158)	.000 (.000)	.143 (.363)
Rg	SSOIL12	.025 (.158)	.000 (.000)	.071 (.267)
Ol	SSOIL13	.050 (.221)	.000 (.000)	.000 (.000)
Oy	SSOIL14	.000 (.000)	.043 (.209)	.000 (.000)
Dominant Vegetative Community Within 225 Meters				
coniferous: open-medium	VEG1	.000 (.000)	.087 (.288)	.143 (.363)
coniferous: medium-dense	VEG2	.450 (.503)	.609 (.499)	.571 (.514)
deciduous: open-medium	VEG3	.000 (.000)	.000 (.000)	.000 (.000)
deciduous: medium-dense	VEG4	.025 (.158)	.174 (.388)	.000 (.000)
mixed coniferous/deciduous: open-medium	VEG5	.000 (.000)	.000 (.000)	.000 (.000)
mixed coniferous/deciduous: medium-dense	VEG6	.050 (.221)	.000 (.000)	.000 (.000)

TABLE 23. DISCRIMINANT ANALYSIS OF SITE VS. NON-SITE LOCATIONS (continued)

Group Means and Standard Deviations (in parenthesis)

Variable	Mnemonic	Non-Site Locations	Prehistoric Sites	Historic Sites
Dominant Vegetative Community Within 225 Meters (cont.)				
scrub oak: open-medium	VEG7	.100 (.304)	.000 (.000)	.000 (.000)
scrub oak: medium-dense	VEG8	.250 (.439)	.087 (.288)	.071 (.267)
mixed scrub oak/ coniferous forest: open-medium	VEG9	.000 (.000)	.000 (.000)	.000 (.000)
mixed scrub oak/ coniferous forest: medium-dense	VEG10	.075 (.267)	.043 (.209)	.214 (.426)
short grass	VEG11	.050 (.221)	.000 (.000)	.000 (.000)
swamps	VEG12	.000 (.000)	.000 (.000)	.000 (.000)
marsh	VEG13	.000 (.000)	.000 (.000)	.000 (.000)
Number of Vegetative Communities Within 225 Meters				
1	DVEG1	.075 (.267)	.000 (.000)	.143 (.363)
2	DVEG2	.375 (.490)	.522 (.511)	.500 (.519)
3	DVEG3	.400 (.496)	.391 (.499)	.286 (.469)
4	DVEG4	.150 (.362)	.087 (.288)	.071 (.267)
Landform				
floodplain	LAND1	.100 (.304)	.043 (.209)	.000 (.000)
ridge slope	LAND2	.700 (.464)	.087 (.288)	.143 (.363)
ridge crest	LAND3	.125 (.335)	.261 (.449)	.571 (.514)
ridge nose	LAND4	.075 (.267)	.391 (.499)	.286 (.469)
first terrace	LAND5	.000 (.000)	.217 (.422)	.000 (.000)

TABLE 24. DISCRIMINANT ANALYSIS OF SITE VS. NON-SITE LOCATIONS

Relative Weight of Means

	Non-Sites	Prehistoric Sites	Historic Sites
Very High	STREAM1,2 ELEV3 VEG8 LAND2	SLOPE1 STREAM5 ELEV2 DSOIL2,8 VEG2 LAND4 LAND5	SLOPE1 ELEV1 NSOIL3 DSOIL11 VEG2,10 LAND3
High	SLOPE2,3 NSOIL2 SSOIL1,2 DVEG4 LAND1	STREAM4 NSOIL4,6 SSOIL1,2 VEG4 DVEG2	WATER4 STREAM5 NSOIL4 DSOIL1 SSOIL4 VEG1 DVEG1,2
Low	ELEV2 VEG2 DVEG2	DSOIL1 VEG1 LAND2	WATER2 SSOIL1 DVEG3 LAND2
Very Low	ELEV1 STREAM5 VEG1,10	ELEV3 SLOPE2,3 VEG8,10 DVEG1 LAND1	ELEV3 SLOPE2,3 NSOIL5 SSOIL2 VEG8 LAND1

In the reclassification stage, only three of the 77 cases were misclassified (i.e., switched from one group to another). In other words, over 96 percent of the cases were reclassified correctly, giving us substantial confidence in the overall results. Beyond simply testing the discriminant results, however, the reclassification stage also allows us to examine what appear to be aberrant site locations. In our data, the three misclassified cases were all sites. These are listed below in Table 25 with the corresponding probability of belonging to the reclassified group based solely on the discriminant results.

TABLE 25. ANOMALIES RESULTING FROM DISCRIMINANT ANALYSIS

Site	Actual Group	Discriminant Group	Probability of Belonging to Disc. Group
9Ce160*	historic	prehistoric	.74
9Ce161*	prehistoric	historic	.88
9Ce166	prehistoric	historic	.90

*Multi-component sites

Sites 9Ce160 and 9Ce161 were originally designated as NWR 37 and NWR 39. Both contain prehistoric and historic components, although the limits of each component do not completely overlap. In the discriminant analysis each component was considered separately; however, the State of Georgia has assigned a single site number even where the boundaries do not correspond precisely. The prehistoric component of 9Ce160 and the historic component of 9Ce161 reclassified correctly.

Site 9Ce166 was probably reclassified as an historic site due to its location on a ridge crest over 225 m from the nearest stream. Regardless of the reasons for its reclassification, the discriminant analysis does highlight the unusual setting of what otherwise are rather 'normal' sites for this area.

Discussion of Discriminant Analysis

To successfully manage the cultural resources of an area the size of Fort Benning, it is absolutely necessary to have some idea of the likelihood that any one location will or will not contain a site. Traditionally, determining factors of site location has been largely

an intuitive endeavor, based on judgemental notions of the relative importance of various locational determinants. The resulting locational models are based on manually plotting the distribution of the selected factors over the project area and then visually inspecting the map to determine areas of 'high,' 'medium' and 'low' site probability.

These types of locational models yield a general impression about where sites should be located and can be efficiently used in making management decisions. In conducting the discriminant analysis, we were trying to take the data a step further to provide some means of predicting whether a specific location will stand a high or low likelihood of yielding a prehistoric site. For such an exploratory venture, the results thus far were very encouraging. The analysis successfully distinguished all site locations from non-site locations and correctly reclassified over 90 percent of historic and prehistoric sites. Objective measures of the environmental variables influencing clustering on site location were obtained which can replace traditional intuitive projections.

The discriminant analysis discussed herein has, therefore, achieved the goals of 1) objectively isolating important determinants of site location and 2) determining the relative importance of each factor for each class of sites. Yet to be accomplished is comparing this model to RSA's model for the remainder of the universe (i.e., the 22,000 ac proposed maneuver area). To achieve this goal, we utilized both our evaluations of RSA's mapping presented in Chapter Six and the results of the discriminant presented in this chapter. In this manner, we have taken the evaluation process to its logical conclusion. The procedures and results of this step are discussed in Chapter Eight.

CHAPTER EIGHT

A STATISTICAL COMPARISON OF THE PREDICTIVE MODELS

Statistically, it is impossible to generalize the discriminant results from the 2,200 ac surveyed tract to the larger 22,000 ac maneuver area in a valid fashion. The area surveyed was not selected through probabilistic means to be representative of the larger maneuver area. Instead, the sample tract was chosen by the Army which plans to use the area for specific activities. In lieu of actually generalizing our results, we felt that it might be useful to compare the predictions of our model for specific locales in the maneuver area against those made by RSA's model (which, parenthetically, was also derived through non-probabilistic sampling; in this case, the survey results of a small area were generalized through judgemental means to the rest of the 22,000 ac). Given the fact that neither RSA's nor NWR's surveys were designed for the results to be generalized in statistically valid ways, it must be clear at the outset that comparing the models of settlement location is meant as a hueristic exercise which may lead to a better understanding of the models themselves.

To compare the models' predictions for the remainder of the maneuver area we need to take a sample of points from the 22,000 ac tract, measure and code the appropriate environmental variables, classify these locales on the basis of their discriminant scores and compare these classifications against the RSA predictions for the same point. The level of concordance between the models, then, can be measured by the percentage of points classified "correctly" according to RSA's model and by the discriminant analysis. If the predictive models were ideal (i.e., could predict all site locations) then we would expect all points from high probability zones to classify as

sites while all points from low probability zones would be designated non-sites. Unfortunately, our models are not nearly that strong. Thus, RSA's probability zones are more reflections of changes in the relative frequency of site occurrence than they are predictors of such occurrences.

To compare the models we need to take into account the expected site density of each probability zone. For example, according to RSA, we should expect to find four sites in every 100 ac in high probability zones. Most of the sites at Fort Benning are small, covering an acre or less. If we assume that each point selected in the analysis characterizes the environmental context of an acre of land then out of 100 points selected from high probability a "perfect" fit between the RSA's and the discriminant model would be indicated by the latter classifying four points as sites and 96 points as non-sites. (Remember this is a fit between the models; it says nothing about the accuracy of the predictions).

The discriminant model is far from perfect; but by virtue of incorporating several times the number of variables than does RSA's model, we feel that the discriminant classification will be a much better prediction of actual site occurrence. The result of applying the discriminant model should be a reduction in the size of high probability zones. Thus, out of 100 points (each representing an acre) from high probability zones, the discriminant analysis may classify 15 to 20 as sites and the rest as non-sites. Out of the 15 to 20 "sites," we should find the four actual sites.

The basic problem with this comparison is that there are no field checks. Neither RSA nor NWR has visited areas in the 22,000 ac outside their survey tracts. Thus, we have no way of determining the accuracy of the prediction of the discriminant model. A future project which would greatly benefit both the managers of Fort Benning and predictive modelling in general would be to field check the points used in this comparison. In this way, we could determine which, if any, of the areas classified as sites actually contained sites. Conversely, we could check to make sure that all points designated non-sites do not have sites.

With these preliminary notions in mind, we now turn to the actual comparison.

OPERATIONAL FRAMEWORK

It was assumed a priori that some problems might exist with RSA's map because of the errors we noted in Chapter Six, but we acted under the hypothesis that these would not be substantial, and, where encountered, could be accommodated by refining the map.

To this end we performed a second discriminant analysis in which 207 additional cases were entered as ungrouped and classified during the reclassification phase of the analysis. Seven of these cases

represented sites previously recorded by either RSA or David Chase within the 22,000 ac maneuver area. (RSA's and NWR's definitions of a site are identical). The remaining 200 cases were judgementally selected locales designed to test the adequacy of RSA's map of the relative likelihood of aboriginal site location (again, only for the 22,000 ac maneuver area).

The 200 judgemental points were selected to evaluate seven specific concerns. First, 60 points were picked from the center of areas defined by RSA as high probability zones. A corresponding second group of 20 points were selected from the center of low probability zones. We used the centerpoints of the probability zones and not some form of probability sampling (e.g., a random selection technique) because most of the problems noted with RSA's model had to do with mapping, especially around the borders of probability zones. We felt that the centerpoints would provide the best control against discrepancies between the two models due simply to mapping of the variables. Thus, we felt that, for the most part, the centerpoints should classify correctly: the high probability zones classifying more as "prehistoric sites" and the low zones classifying largely as "non-sites."

The third group consisted of 20 points selected from low probability zones (one was actually from a medium probability zone) located between 90 m and 225 m of a stream and adjacent to high probability zones. In this instance, we wanted to test the accuracy of RSA's mapping of distances, such as the variable "distance to water." It was in this mapping procedure that we had noted some inconsistencies that could pose potential problems for accurate prediction. If a higher than expected number of these points classified as "prehistoric sites" then it is possible that the probability zones may be misplotted and then we would want to make some adjustments in the map.

The fourth group of judgementally selected points was also picked to evaluate a "distance to water" variable. In this case, 20 points (17 from low probability zones and three from medium probability zones) adjacent to streams 500 m or less in length were selected. RSA's model did not consider streams of this size as potential water sources, an assumption we wanted to test.

The fifth group consisted of 60 locales found on the border between low and high probability zones. All 60 points were located on the low probability side of the border. If a higher than expected number of these were reclassified as "prehistoric sites" then we might either want to create a buffer zone to allow for mapping distortions or redraw the boundary.

The final two groups were designed to test differences we noted between the 1928 and 1958 soils maps. The sixth group consisted of ten locales placed on soils considered favorable for human occupation if we used the 1928 soils map but unfavorable if we used the 1958 soils map. The seventh group was composed of ten points found in the

opposite situation; favorable on the 1958 map, but unfavorable from the perspective of the 1928 map. RSA based their study of the relation between soils and prehistoric occupation on the 1928 soils map. We have demonstrated (see Chapter Six) that the 1958 soils map is a better map from which to evaluate this relationship. The purpose behind these last two groups of judgementally selected points is to see whether significantly more sites are classified "prehistoric sites" using one map over the other and if so whether the results indicate that changes are needed in the probability map.

On the probability map which accompanies this report the 207 points are illustrated. Table 26 summarizes the rationale behind the selection of these cases and the expected outcome. It will be noted that the expected outcomes are phrased in relative terms. This is because we feel that our model is still fairly crude and while we can predict "more-or-less" we are still not a point at which the expectations can be quantified.

Procedures

From the first discriminant analysis we knew which variables were the most important discriminators (see Chapter Seven). To maximize time and monies we eliminated three major environmental variables from the analysis. These included site specific soil (14 dummy variables), relative elevation (3 dummy variables), and slope (3 dummy variables). The first, site specific soil, was eliminated because it was highly intercorrelated with other variables (see Table 22). The remaining two variables were not used because of problems in measurement. Relative elevation, which had proved useful in separating sites from non-sites (function 1) is extremely time consuming to measure. Moreover, in checking over our field notes we found a number of discrepancies between scores as measured off U.S.G.S. quad maps and scores measured in the field. For instance, we had several cases in which field observation show that a site or non-site point was well-drained. Yet when the relative elevation for the same point was measured from the U.S.G.S. quad map it was scored as a flat surface because the changes in elevation were not severe enough to cross a ten-foot contour line. For the 2,200 ac project area, these problems were handled by continually referring to the field notes. However, because we did not personally visit the 207 previously known sites and judgemental locales used in the second analysis, we felt the most secure approach would be to delete relative elevation as a variable.

Similar reasoning led to the elimination of slope as a variable. While slope is perhaps the strongest discriminator between sites and non-sites in the project area, it is extremely difficult to measure. Although we can obtain a reasonable estimate for a general area by using a slope indicator template, this technique is imprecise and we are still not able to detect small level benches in ridge slopes or abrupt inclines on otherwise flat terraces. Slope is one variable in which the only value that really counts is the one directly on the site. Until we can be sure we can measure this value, it is probably best to delete it from consideration.

TABLE 26. CASE GROUPS USED IN SECOND DISCRIMINANT ANALYSIS

Group	No. of cases	Description	Relative Expectations
1	60	center of H.P.Z.	relatively high proportion should be classified as "prehistoric site."
2	20	center of L.P.Z.	few, if any, should be classified as "prehistoric site."
3	20	in L.P.Z., between 90-225 m of a stream and adjacent to a H.P.Z.	higher proportion of cases classified as "prehistoric site" than for Group 2.
4	20	located in L.P.Z. and M.P.Z. adjacent to streams less than 500 m in length.	higher proportion of cases classified as "prehistoric sites" than for Group 2.
5	60	in L.P.Z. adjacent to H.P.Z.	higher proportion of cases classified as "prehistoric sites" than for Group 2, but lower proportion than Group 1.
6	10	favorable location according to 1928 soils map, unfavorable according to 1958 soils map.	fewer cases scored as "prehistoric sites" than for Group 7.
7	10	favorable location according to 1958 soils map, unfavorable according to 1928 soils map.	more cases scored as "prehistoric sites" than for Group 6.
8	7	all previously recorded sites within the 22,000 ac maneuver area 6 prehis., 1 multicomp., (historic/prehistoric).	all cases should be classified either "prehistoric" or "historic site."

Legend

H.P.Z. - high probability zone
M.P.Z. - medium probability zone
L.P.Z. - low probability zone

Dummy variables for the seven remaining environmental features were coded for the 207 previously known sites and judgementally selected locales. In all, 27 dummy variables were entered into the discriminant analysis of which 16 were actually used to compute the resulting functions (Table 27).

RESULTS

The discriminant analysis was run at the University of Texas computer center, Houston, Texas. The analysis was again computed using the SPSS version 8.0 DISCRIMINANT subprogram utilizing the stepwise procedure which maximizes Rao's V. The same 77 cases were used to compute the discriminant functions with the only exception being that this time only seven environmental features were recorded and site 9Ce155 was correctly coded as an historic component.

The results mirrored the first analysis. Two discriminant functions were defined, the first function accounted for 86.5 percent of the total variance and was significant at the .0001 level. This function again separated sites from non-sites. The second discriminant function explained 13.5 percent of the variance and was significant at a .18 level. The low level of significance and the small proportion of variance explained indicates that most of the discriminating power in the variable set is removed by the first function. The separation of historic from prehistoric sites, which is accomplished by the second function, then is much weaker than the discrimination of sites from non-sites.

The reduced set of variables resulted in a slightly lower proportion of "hits" during the reclassification stage (Table 28). Overall, 88.3 percent of the 77 cases were reclassified correctly. However, only 77.3 percent of the prehistoric sites were reclassified correctly, with the remaining 22.7 percent classified as historic sites. In all, the discrimination between site and non-site was extremely accurate (over 96 percent "hits"). The separation of site groups (prehistoric vs. historic) while not as strong (79 percent "hits") was still at an acceptable level.

Classification of Ungrouped Points

Tables 29 and 30 summarize the discriminant results for the 207 cases entered into the analysis as "ungrouped." In evaluating the results it should be kept in mind that during this analysis the prior probability of an ungrouped case being classified as one of the three groups was equal (an SPSS option). Thus, if the discriminating power of the analysis is zero we would expect one-third of the cases to be classified as prehistoric sites, one-third as historic sites, and one-third as non-sites. These will be discussed on a group by group base.

TABLE 27. MNEMONICS USED IN SECOND DISCRIMINANT ANALYSIS

Variable	Used to compute discrim. function	Entered in discrim. function; not used to compute discrim. function	Not entered in discriminate analysis
No. of streams within 225 m	Stream 2,3,5,6	Stream 1,4	Stream 7
Dominant veg. zones w/in 225m.	Veg. 1,6,7,8,10,11	Veg. 2,4	Veg. 3,5,9,12,13
No. of veg. zones w/in 225m.	D.Veg. 2,3,4	D.Veg. 1	
Landform	Land 1,2,5	Land 3,4	
No. of soils w/in 225m.	N Soil 5	N Soil 1,2,3,4	N Soil 7
Dominant soils w/in 225m.	D Soil 2,4,6	D Soil 1,8,9,11,13	D Soil 3,5,7, 10,12,14

TABLE 28. PREDICTED GROUP MEMBERSHIP
OF THE SECOND DISCRIMINANT ANALYSIS

ACTUAL GROUP		PREDICTED GROUP MEMBERSHIP		
	no. of cases	non-site	prehistoric site	historic site
Non-site	40	38 95.0	0 0	2 5.0
Prehistoric Site	22	0 0	17 77.3	5 22.7
Historic Site	15	1 6.7	1 6.7	13 86.7

Number of Grouped Cases correctly classified - 68 cases
Percent of Grouped Cases correctly classified - 88.31%

TABLE 29. DISCRIMINANT CLASSIFICATION OF 200 JUDGEMENTALLY SELECTED "UNGROUPED" POINTS.

	SAMPLE GROUPS							TOTAL		
Predicted Group	HPZ 1	LPZ 2	In LPZ between 90-225 m of a stream adj. to HPZ 3	LPZ adj. to streams less than 500 m 4	In LPZ adj. to HPZ 5	Fav. 1928 soil/Unfav. 1958 soil 6	Fav. 1958 soil/Unfav. 1928 soil 7	HPZ	MPZ	LPZ
Non-site	35(58.3)	11(55.0)	13(65.0)	18(90)	37(61.7)	6(60)	4(40.0)	35(58.3)	6(50.0)	84(65.6)
Prehistoric site	9(15.0)	2(10.0)	1(5.0)	1(5.0)	2(3.3)	0	1(10.0)	9(15.0)	1(8.3)	5(3.9)
Historic site	16(26.7)	7(35.0)	6(35.0)	1(5.0)	21(35.0)	4(40)	5(50.0)	16(26.7)	5(41.7)	39(30.5)
Total	60(100.0)	20(100.0)	20(100.0)	20(100.0)	60(100.0)	10	10(100.0)	60(100.0)	12(100.0)	128 (100.0)

Note: Table to be read as frequency: percentage of sample group. E.g., Sample Group 1, 35 (58.3) should read 35 cases in Sample Group 1 classified as non-sites which equals 58.3 percent of total Sample Group 1 cases.

TABLE 30. CLASSIFICATION OF UNGROUPED POINTS

Case No.	Length of Drainage (in meters)	Distance from Head of drain. (in meters)	Landform	Discriminant Classification
122	200	50	RS or FT	prehistoric (FT) non-site (RS)
129	600	50	RS or FT	prehistoric (FT) historic (RS)
130	300	100	RS or FT	prehistoric (FT) non-site (RS)
137	1000+	0	RS or FT	prehistoric (FT) historic (RS)
140	350	100	RS or FT	prehistoric (FT) historic (RS)
156	1000+	50	RS or FT	prehistoric (FT) non-site (RS)
159	1000+	0	RS or FT	prehistoric (FT) non-site (RS)

Legend

RS - Ridge slope
FT - First terrace

Group 1: Cases located in the center of HPZs[1]

Of the 60 cases in Group 1, nine (or 15 percent) were classified as prehistoric sites. At first glance, this result may seem to indicate that there are major problems with the mapping of HPZs by RSA. However, we need to remember that the expected site density in HPZs is only .04 sites per ac. If we assume that each case reflects the environmental context of one acre, then out of the 60 cases we should find two or three prehistoric sites.

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[1] The abbreviations HPZ, MPZ, and LPZ are used in this discussion to signify high probability zone, medium probability zone, and low probability zone, respectively.

Instead of too few, it now appears that there are too many prehistoric sites. However, the fact that a case has been classified as a prehistoric site does not mean that a site will actually be found there. Rather the classification only means that the environmental context of the area is similar to that favored by prehistoric settlement.

The real problem here is not the number of cases classified as sites but whether the "right" cases were classified as sites. This analysis was not designed to answer this question. Instead, we are interested in the reliability of the two models (not their accuracy). As discussed above this can only be assured in a relative way (in lieu of additional fieldwork). Thus, whether 15 points is too high or too low a number can only be determined after reviewing all the groups.

Group 2: Cases located in the center of LPZs

Only two out of the 20 cases selected from the center of LPZs were classified as prehistoric sites. Of these, one (Point 195) lies in an area that should have been designated a HPZ according to RSA's criteria (it lies on a ridge crest, on favorable soils and close to water). The second case (Point 196), which is correctly plotted in a LPZ probably represents a localized area where the environmental context deviates substantially from the surrounding region.

If we exclude Point 195 as a mapping error, we find that approximately five percent of the cases in LPZ contain the type of environment favored by the prehistoric inhabitants of the region. Although this figure is substantially higher than the expected frequency of .001 sites per acre in LPZ, it is still much lower than the 15 percent classified as prehistoric sites in HPZs. So relatively speaking, classification of points from the center of HPZs and LPZs does not deviate substantially from our general expectations.

Group 3 and 4: Distance Measurement and Water Source Cases

Forty points comprised these groups, with 20 assessing the actual distance to water measurement and 20 assessing the importance of including streams less than 500 m as potential water sources. Thirty-six of these points were from LPZs and four were from MPZs. Only two points, or five percent of the cases, from Groups 3 and 4 were classified as prehistoric sites. Seven or 17.5 percent were classified as historic sites, but this fact does not affect the accuracy of RSA's map since it is devised for predicting prehistoric sites alone. The remaining 31 points (77.5 percent of the cases) all classified as non-sites.

Out of all 40 cases in these two groups, the only ones that we felt were erroneously classified were Points 82 and 86 in Group 4 which were classified as an historic site and non-site respectively. Both points were near streams less than 500 m in length. Although these points might be more realistically classified as prehistoric

sites, one important factor enters into their classifications according to the discriminant. This is our inability to distinguish with precision some landforms from the U.S.G.S. quadrangle map or the Fort Benning Terrain Analysis maps. This problem is especially acute in minor drainages where first terraces (a "favored" location) are only weakly developed and tend to blend into ridge slopes (a highly "unfavored" location). In the cases of Points 82 and 86, both were scored as located on ridge slopes. However, had they been scored as first terraces both cases might have been classified as prehistoric sites.

Short of an actual field visit (in which case we could determine whether or not the area actually contained a site) the best solution is to draw a "buffer zone" in these minor drainages where we cannot accurately determine site probability. From a management perspective these areas probably need to be considered HPZs. Future work will determine whether or not this evaluation is accurate.

Overall, however, the discriminant results for Groups 3 and 4 suggest several things. First and foremost, distance to water alone does not change an otherwise undesirable location into a desirable one for settlement. Second, any discrepancies that might arise from RSA's manual mapping of distance do not seem to diminish the predictive power of their zones. And, third, although RSA did not consider streams less than 500 m in their model, the inclusion of these small water sources does not appear to alter dramatically the efficacy of the sensitivity zones. Instead, careful consideration needs to be given to the landform associated with these minor drainages to determine with accuracy the importance of a stream less than 500 m in length to prehistoric site location.

<u>Group 5: Cases in LPZs adjacent to HPZs</u>

Only 3.3 percent (N=2) of the cases in Group 5 were classified as prehistoric sites. At first glance this result appears to corroborate the borders between the probability zones as drawn by RSA. This result, however, is somewhat misleading. Another seven cases which were classified as either historic sites or non-sites perhaps should have been classified as prehistoric sites. All seven are located on terraces or ridge slopes near the heads of river drainages or tributaries (see Table 30).

Further, in each case, the surrounding environmental profile seems to fit the description of locales favored by prehistoric occupants with the possible exception of topography and slope. These are exactly the variables we cannot accurately measure from the available maps. Again, field verification of these variables is required before we can state whether the sensitivity borders are indeed in error or whether other factors make the locales indeed low zones for site probability. All we can do at this point is to make a provisional change to the RSA map by outlining again a buffer zone which will alert Fort Benning planners to areas which might be incorrectly mapped for site sensitivity.

Groups 6 and 7 : "Soils"

No cases were classified as prehistoric sites in either Groups 6 or 7. One case in Group 7 (Point 176) classified as an historic site, but may actually be better characterized as a prehistoric site since the vegetative communities within 225 m of the point are equally divided between mixed coniferous/deciduous forest: medium to dense spacing (Veg6) and mixed scrub oak/coniferous forest: medium to dense spacing (Veg10). Changes in the manner of scoring this variable shift the classification of this case.

Overall, however, the results are encouraging in so far as the utility of RSA's map is concerned. The data indicate that differences in soil mapping, although present between the 1928 and 1958 soils maps, do not appear to have an effect on the discriminant results. Thus, RSA's use of the 1928 soils map should not diminish the overall effectiveness of their probability zones in predicting aboriginal site location.

Group 8: Previously Known Sites

Nine sites had been recorded in the 22,000 ac project area prior to our survey. Two of these sites, 9Ce93 and 9Ce101, are found in the 2,200 ac survey area and were included in the sample used to define the discriminant functions.

Six of the remaining seven, are prehistoric sites (9Ce40, 9Ce43, 9Ce44, 9Ce45, 9Ce50, 9Ce116) and one contains both an historic and prehistoric component (RSA recorded this site as two individual sites; it has been assigned State of Georgia numbers 9Ce115 and 9Ce120). The discriminant functions correctly classified four or 66.7 percent of the prehistoric sites (Table 31).

TABLE 31. CLASSIFICATION OF PREVIOUSLY KNOWN SITES

Predicted Group	Actual Group Prehistoric n=6	 Multicomponent n=1	
prehistoric	4(66.7)		
historic	1(16.7)	1(100)	
non-site	1(16.7)		
Total	6	1	= 7

By chance alone we would expect two or 33.3 percent of the sites to be correctly classified. Thus, the discriminant model is twice as good a predictor as chance guessing but still could be improved by 50 percent. The one multicomponent site was classified as an historic site. Of the two cases incorrectly classified one (9Ce40) is located in an LPZ and the other (9Ce44) in an MPZ and both are described as small scatters of cultural materials (Chase 1957).

SUMMARY

The results of our second discriminant analysis have largely supported the efficacy of RSA's model. Although we had pinpointed some possible areas of potential error (e.g., use of the 1928 soils map over that produced in 1958 and the failure to include streams less than 500 m as potential water sources), the discriminant functions show that none of these are substantial enough to negate the utility of the RSA model. This is a particularly important discovery since our project focused only on a small area of Fort Benning, the entirety of which was mapped by RSA. Thus, while some errors do exist, and we can remedy these by making revisions to the map for the 22,000 ac maneuver area, in general the effort expended by the Army and RSA has been highly worthwhile for all of Fort Benning.

In the following chapter, we present our recommendations for making adjustments to the existing map of the 22,000 ac maneuver area and allowing for more discrete examination of proposed areas of impact in the remainder of Fort Benning. Also included in that chapter are our recommendations on potential site significance for cultural resources examined during the course of this project.

CHAPTER NINE

CONCLUDING REMARKS AND RECOMMENDATIONS

The analytical and statistical procedures outlined in the preceding chapters are an example of what we feel is a good multistage approach to analyze survey results, evaluate existing interpretations of site location, refine existing interpretations, and extrapolate those revisions to the remainder of the study universe.

In reviewing the evolution of this procedure, we first undertook a non-statistical evaluation of RSA's model by comparing our sample results to the expected results based on their delineation of probability zones. In this task we isolated several areas which we felt might contribute to erroneous predictions of prehistoric site location. Following, we attempted another type of analysis on our sample results by conducting a discriminant analysis to determine the combinations of variables within a catchment area that seem to influence site location. Using the results of the discriminant, we were able to test, by a second discriminant analysis, whether the problems we noted by manual examination of RSA's model were sufficient enough to actually skew predictions and thus diminish the utility of the model.

We felt, on an *a priori* basis, that the RSA model was generally good and the problems would not dramatically reduce its effectiveness. The second discriminant analysis proved this assumption to be basically sound by upholding their overall classifications of high,

medium, and low probability zones and by illustrating that discrepancies which do exist either 1) alone do not affect the map's credibility or 2) can be accounted for by minor changes.

The problems necessitating revision to the map had less to do with actual errors on RSA's part or interpretation of the discriminant functions than in deriving environmental information from the available maps. In particular, determining landform, especially in minor drainages, proved to be extremely difficult. Other variables such as slope and relative elevation were actually deleted from the analysis due to problems in measuring them.

As a consequence, we were unable to provide precise estimates of site probability for certain areas. Especially affected by these problems were areas in or near minor drainages. In many parts of these drainages the environmental profile is similar to areas containing prehistoric sites. However, without either a measure of site specific slope or landform, we simply cannot state with any assurance the possibility that the locale will or will not contain a site.

Consequently, we have revised RSA's map of the 22,000 ac maneuver area by two means. First, areas which were revealed to be misplotted on their probability maps (e.g., because of the presence of a drainage that was not considered or simply that a small area was erroneously mapped) have been formally corrected to illustrate the correct probability zone (RSA'a work maps are on file at NWR). Second, for areas which remain problematic in the absence of field verification (e.g., particularly areas of minor drainages), we have designated a "buffer zone." These should be inspected closely in the future if they are to be impacted.

Within the 22,000 ac maneuver area, closer inspection in lieu of fieldwork can be accomplished by computing the discriminant scores for a specific area. The procedure involved is quite simple. The score is computed by using the unstandardized discriminant function coefficients as weights. The values for each variable are then multiplied by the appropriate weight and added to a constant. We suggest using the results of the second discriminant analysis performed (see Chapter Eight). This analysis gave satisfactory results and used only seven variables.

The unstandarized discriminant coefficients rounded to the hundredth are listed in Table 32. Because of the use of dummy variables, the computations are much less formidable than they appear. To calculate the discriminant score one merely multiplies the unstandardized coefficients by 1 (if the environmental feature is present) or 0 (if it is absent). The resulting scores are added together along with the constant as in the following equation:

TABLE 32. UNSTANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS

Variable	Function 1	Function 2
Stream2	-1.166588	.3746468
Stream3	.5671981E-01	1.501981
Stream5	1.771509	1.017159
Stream6	2.649100	2.066509
Veg1	1.569912	.9168562
Veg6	-1.563045	.7309985
Veg7	-2.080404	.3011874
Veg8	-1.151775	.2042219
Veg10	-.1848955	1.473839
Veg11	-1.775752	.48141815-03
DVeg2	-.7305476	-1.286351
DVeg3	-.2042952	-1.714605
DVeg4	-1.591033	-1.811398
Land1	-1.254419	.4884171
Land2	-1.640819	-.2527600E-01
Land5	1.276200	-2.517896
NSoil5	-.9516663	-1.032780
DSoil2	1.671848	-1.327298
DSoil4	-.7421112	-.3589234
DSoil6	2.353132	-.5458052F-01
CONSTANT	1.511753	1.013056

FUNCTION 1	Di =-1.7 (stream 2) + .06 (stream 3) + 1.77 (stream 5) + 2.65 (stream 6) + 1.57 (veg 1) - 1.56 (veg 6) - 2.08 (veg 7) - 1.15 (veg 8) - 1.78 (veg 11) - .73 (Dveg 2) -.20 (Dveg 3) - 1.59 (Dveg 4) - 1.25 (land) - 1.64 (land 2) + 1.27 (land 5) - .95 (Nsoil 5) + 1.67 (Dsoil 2) - .74 (D-soil 4) + 2.35 (Dsoil 6) + 1.51
FUNCTION 2	Di =.37 (stream 2) + 1.50 (stream 3) + 1.02 (stream 5) + 2.07 (stream 6) + .96 (veg 1) + .73 (veg 6) + .30 (veg 7) + .20 (veg 8) + 1.47 (veg 10) + .00 (Dveg 11) - 1.29 (Dveg 2) - 1.71 (Dveg 3) - 1.81 (Dveg 4) + .49 (land 1) - .03 (land 2) - 2.52 (land 5) - 1.03 (Nsoil 5) - 1.33 (Dsoil 2) - .36 (Dsoil 4)- .05 (Dsoil6) + 1.01.

Where i equals any point in the 22,000 ac maneuver area.

For example, the site 9Ce50 has the following values for the discriminating variables:

Variable	Value	Mnemonic
Number of streams	1	Stream2
Dominant vegetative zone	coniferous forest medium to dense	Veg2
Number of vegetative zones	2	DVeg2
Land form	first terrace	Land5
Number of soils	4	Nsoil4
Dominant soil	(H)	Dsoil10

These values were all derived from the appropriate maps listed in Table 19. (The way each variable was measured is discussed on pages 108-111, Chapter Seven). 9Ce50's scores on the two discriminant functions are:

FUNCTION 1	D= 1.17(1) + .06(0) + 1.77(0) + 2.65(0) = 1.57(0) - 1.56(0)- 2.08(0) - 1.15(0) - 1.78(0) - .73(1) - .20(0) - 1.59(0)- 1.25(0) - 1.6(4(0) + 1.27(1) - .95(0) + 1.67(0) - .74(0) + 2.35(0) + 1.51 = -1.17 - .73 + .127 + 1.51 = .88
FUNCTION 2	D= .37(1) + 1.50(0) - 1.01(0) + 1.07(9) + .91(0) + .73(0) + .30(0) + .20(0) + 1.47(0) + .00(0) - 1.28(1) - 1.71(0) - 1.81(0) + .49(0) - .02(0) - 2.52(1) - 1.03(0) - 1.33(0) - .36(0)- .05(0) + 1.01 = .37 - 1.29 - 1.51 + 1.01 = -2.43

Once computed the scores can then be plotted on the territorial graph of the first two discriminant functions (Figure 25). This graph as been divided into three areas each corresponding to one of the three groups. Cases falling into one of the regions, then, most likely belong to that group. The exact probabilities that a case belongs to a group can be computed, but the formula is much more complicated and one needs at least a hand calculator which computes natural logarithms to compute it easily. We prefer, and think managers at Fort Benning will as well, to use the territorial map as a guide because it is so much quicker and easier and provides results accurate enough for initial planning.

GENERAL RECOMMENDATIONS: AREAS OUTSIDE MANEUVER AREA

The preceding discussion has focused on the 22,000 ac maneuver area alone. This is all that we are in a position to evaluate at this time because of the scope of work as well as the fact that environmental characteristics differ substantially in other areas of the reservation. For example, the Chattahoochee River drainage with its broad floodplain poses a dramatically disparate environmental situation than that found in our 2,200 ac survey tract or even the larger 22,000 ac maneuver area. These other areas were not tested by our work, however, and short of conducting a similar evaluation throughout the remainder of Fort Benning, we can suggest one approach that might maximize use of RSA's maps. This would be to extend each high probability zone by an arbitrary 200 m to ensure that problems possibly existing with borders of probability zones can be minimized. This procedure is similar to that we used in revising the 22,000 ac maneuver area map by creating "buffer zones."

GENERAL COMMENTS ON MODELLING AT FORT BENNING

To perpetuate revisions and refinements, the Army could make additional use of our discriminant analysis on any future cultural resource management projects by requiring similar tests. This is particularly necessary when future projects may impact an area in which soils or other environmental conditions not found in either our work or that of RSA, appear.

An example of similar work might serve to illustrate this point. At Redstone Arsenal, in northern Alabama, we conducted a sample survey and testing project which resulted in a probability map of high, medium, and low sensitivity zones. Since certain soils and other factors did not occur in our sample universe, we avoided premature evaluations of these variables. On a subsequent project at Redstone, we had the opportunity to survey areas in which soils not previously surveyed were found. To revise our own Redstone model, we evaluated site frequency in association with these soils and our previous work to arrive at a more advanced predictive model, encompassing new situations.

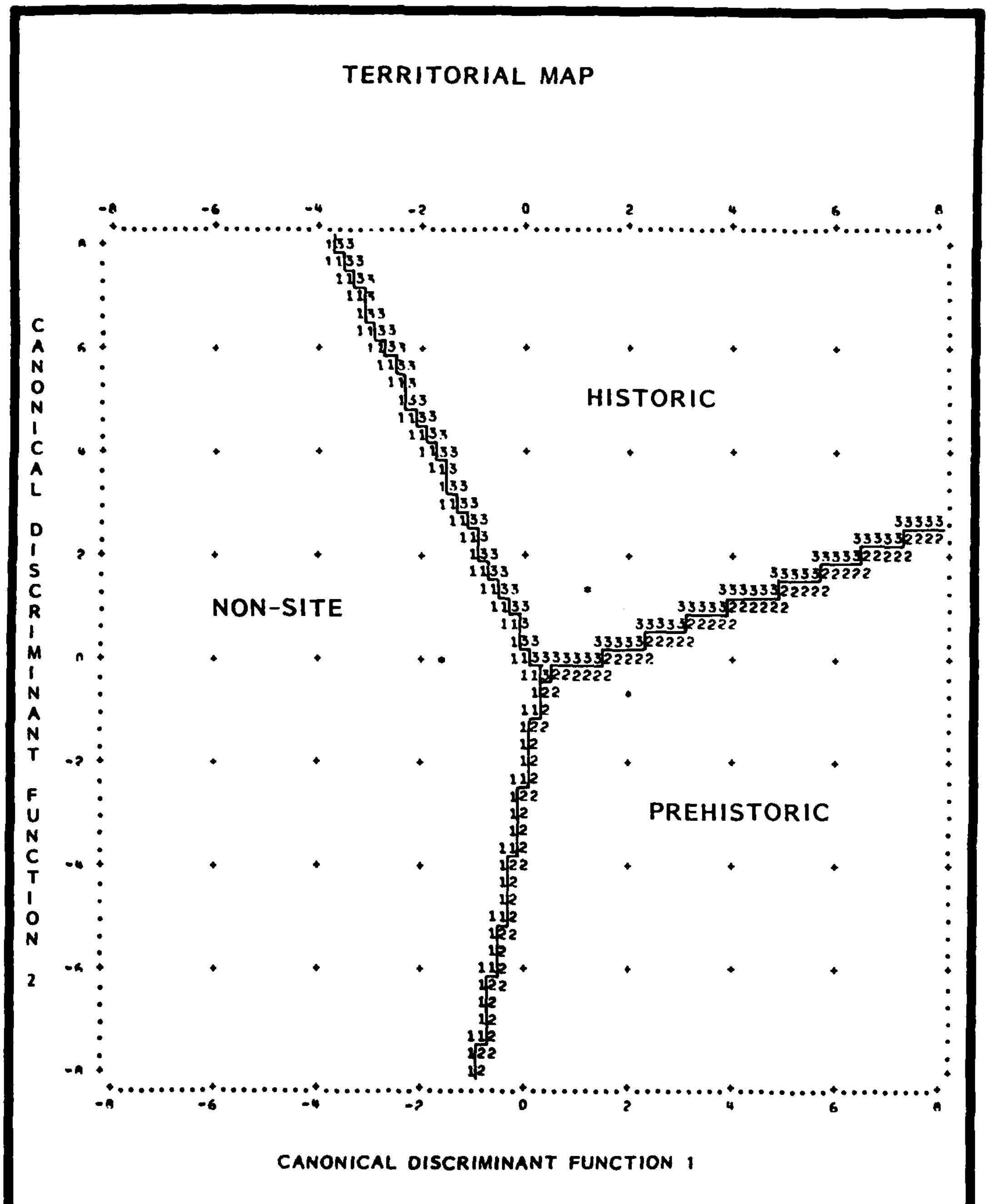

FIGURE 25. DISCRIMINANT ANALYSIS OF SITE AND NON-SITE LOCATIONS, 22,000 AC MANEUVER AREA.

NWR

* Group centroid

1 Non-site points

2 Prehistoric sites

3 Historic sites

The point here is to carry through on a procedure for comprehensive cultural resource management. RSA produced a generally applicable map which was refined on the basis of our work. We feel that we have also added some insight into other combinations of variables which distinguish prehistoric from historic sites and all sites from non-sites. For such an exploratory venture, the results were very encouraging. Objective measures of the environmental variables influencing clustering on site location were obtained which can replace traditional intuitive projections.

We feel, however, that there is still room for improvement and expansion through future work. Refinements could be made in the procedures that would increase the power of this type of analysis both as a management and analytic tool.

A first area of refinement involves variable construction and measurement. Dummy variables were used exclusively in the analysis. These rather crude variables are designed to transform nominal scale information into interval scale measures. Many environmental features, such as landform or soil type, probably need to remain at this level of measure. However, some variables, like slope or distance to water, are already measured at an interval scale and to reduce them to dummy variables necessitates sacrificing information. Other variables, such as dominant soil type within 225 m could be measured on an interval scale as the percentage of various soil types in the catchment zone.

For the initial analysis, we chose not to mix scales. In the past, we have found that mixing interval scale variables with dummy variables tends to weight the former. In large part, this results from interval scale variables producing greater variances and, therefore, having multivariate statistical procedures key in on them first (Cowgill et al. n.d.:107-110).

A related problem concerns the need to reduce intercorrelation among the variables. To start. we can use the correlation matrix produced by the discriminant analysis to determine which variables are strongly linked. We can, then, examine the relationships further through more sophisticated statistical models such as partial correlation and multiple regression. From these studies, we should be able to isolate a few key, more-or-less independent environmental variables. We can, then, begin to think hard about how to measure these variables on an interval scale.

The last point we want to make concerns the relationship between statistical results and cultural 'significance.' While the analysis is designed to determine where different groups of theoretically-related sites are likely to be located, it also throws light on specific sites which are situated in locales generally avoided by the majority in the group. Regardless of their other attributes, these sites are 'significant,' in that the decisions that went into locating in these areas cannot be explained by our present models. These

sites, then, will lead to new understandings which may refine or alter our present models.

We emphasize this point because the trend in American archaeology is to use statistical techniques to demonstrate a point. Thus, there is a tendency to downplay or ignore cases that do not behave in the prescribed way. In so doing, however, investigators have unknowingly shut themselves off from the vast potential statistics have as heuristic devices. Given the general state of our understanding, this is a regrettable loss.

STATEMENTS ON POTENTIAL SITE SIGNIFICANCE

The majority of the sites recorded during this survey fail to meet the criteria for eligibility to the National Register of Historic Places (NRHP). In order to evaluate properly structure significance, strict criteria must be outlined. The following criteria are designed to guide the States, Federal agencies, and the Secretary of the Interior in evaluating potential entries (other than areas of the National Park System and National Historic Landmarks) for the National Register (National Register of Historic Places 1976):

The quality of significance in American history, architecture, archeology, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feelings and association, and:

A. that are associated with events that have made a significant contribution to the broad patterns of our history; or

B. that are associated with the lives of persons significant in our past; or

C. that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

D. that have yielded, or may be likely to yield, information important in prehistory or history.

Ordinarily cemeteries, birthplaces or graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, properties primarily commemorative in nature, and properties that have achieved significance

within the past 50 years shall not be eligible for the National Register. However, such properties will qualify if they are integral parts of districts that do meet the criteria or if they fall within the following categories:

A. a religious property deriving primary significance from architectural or artistic distinction or historical importance; or

B. a building or structure removed from its original location but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event; or

C. a birthplace or grave of a historical figure of outstanding importance if there is no other appropriate site or building directly associated with his productive lifestyle; or

D. a cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events.

These criteria were followed to the extent that data from the survey would enable us to make recommendations on eligibility. Site descriptions for all sites identified during the course of the project are presented as Appendix One. Each site description summarizes the pertinent characteristics of the site, its setting and the recommendations. Only two sites are considered potentially eligible for inclusion onto the National Register. These are discussed in more detail below.

Potentially Significant Sites

9Ce51

9Ce51 is a large prehistoric site situated along the first terrace west of Sally Branch. The site is linear in configuration, measuring about 710 m north-south with a maximum width of approximately 120 m. The site area has been disturbed by two, now abandoned roads. The first, which may also have functioned as a fire break, extends the length of the site. The second appears as a short extension of the first and is confined to the northern periphery of the site.

A thin surficial scattering of prehistoric artifacts is present on the surface and three major concentrations of artifacts are present in the northern one-third of the site. Concentration A is located in the extreme northwestern corner of the site and has been impacted by the smaller, secondary road. A total of 38 shovel tests were placed

in a cruciform pattern across the area; of that number, 19 yielded artifacts with the highest number from any test being five lithics. Concentration B parallels the eastern boundary of the site, and is situated south of Concentration A. Forty-two shovel pits were placed across the concentration; 20 yielded artifacts. Concentration C is the smallest in areal extent of the three concentrations. It is located southwest of Concentration B, and is separated from it by approximately 25 m. While 17 shovel pits were placed across the concentration, only three yielded artifactual materials.

In addition to the shovel pits placed to define the concentrations, shovel pits had been placed along the survey transects which crossed, east to west, the site area. Shovel pits 7-4, 15-10 and 16-10 (these number combinations refer to transect number and shovel pit number on transect) yielded single prehistoric flakes; shovel pit 8-5 produced one plainware sherd; shovel pits 7-2 and 14-5 yielded both a flake and a plainware sherd.

While the various shovel pits did not reveal the presence of midden, artifacts were recovered to a depth of 50 cm. Artifactual materials recovered from the site in both surface and subsurface contexts are presented in the 9Ce51 discussion in Appendix One; in sum, however, they included a Hamilton projectile point, 33 plain sand and sand/grog tempered ceramics, and over 100 chert and quartzite flakes. The artifacts suggest that the site was utilized sometime during the latter portion of the Woodland period.

The relatively undisturbed nature of the site in combination with the occurrence of artifactual materials in subsurface contexts suggests that further investigation of the site should be conducted. Although Woodland period sites have been tested within the Fort Benning area (see Chapter Two) questions concerning the upland, interior utilization of the reservation still remain to be resolved. The presence of both ceramics and lithics would suggest that the site area functioned as a possible base camp or village location, and the distinct concentrations of artifacts would point to differential use of various locations for individual tasks. If such is the case, the importance of the site in furthering definition of intra-site spatial patterning should not be overlooked. For these reasons, we would recommend that additional testing be conducted at the site.

9Ce155

9Ce155 is an historic mill site on Sally Branch. The site consists of an earthen dam with a mill sluice located on the western side of the dam. The dam has been cut by Sally Branch near its eastern side, but remains essentially intact. It measures approximately 45 m west to east and is approximately five meters wide; it presently stands about two meters high. To the north of the sluice or race is a depression, which at the time of site recording was filled with standing water. A partial turbine comprised of a series of circular "saws" attached to a single rod, is located to the immediate northwest

of the pond. The turbine is apparently the type which was used to separate cotton fibers from seeds. From the pond to the northeast, a trace of the mill sluice channel is present, connecting with Sally Branch.

Indepth studies of 19th and early 20th century mill sites has increased within the last ten years, but to our knowledge no such sites have been investigated within the Fort Benning area. These examples of rural life should be examined, mapped and thoroughly documented prior to their loss. We recommend that further work, in terms of archival documentation and mapping be conducted as the site is considered potentially eligible.

Recommended Actions

In making our recommendations, we stress the policy of avoidance where at all possible. Usually this is the most cost effective means of managing cultural resources that are potentially significant. Where it is not possible, we urge a testing program or background study, depending upon which is the most applicable.

Where testing is necessary, we recommend a controlled surface collection if conditions are suitable. The collection strategy should be sufficient to obtain a representative sample of all classes of artifacts and to identify areas of concentration. A minimum of two 1 m by 1 m test units should also be excavated to below artifact bearing horizons. Standard state-of-the-art illustration and recordation of test pit data should be followed to provide complete documentation of the excavation.

An alternative approach can be highly effective for shallow prehistoric sites. This procedure includes the excavation of at least one test unit and auger holes to determine positively that no pockets of midden or features exist and that the site is confined to an upper disturbed horizon. If confirmed, the soil can be tilled and after dousing (or a good rain) the area can be surface collected in controlled units. This approach is quick, efficient, and can yield a bulk of information from a site that, through traditional testing, would only provide the minimum of data.

It is somewhat difficult to estimate total costs for excavation since the costs decrease proportionate to the amount of sites included in the testing program. This is because in figuring costs on a per site basis, we must include mobilization and demobilization per site, per diem expenses per site, transportation costs per site, etc. If, for example, five sites are to be tested, we would figure only one cost for mobilization and demobilization. Per diem and transportation might be cut since part of the crew could be completing work (recording, drawing, etc.) on one site while the remainder of the crew moved on to begin testing at another locale.

In preparing plans for testing, consideration should be given to immediate and future plans so that the most cost-effective approach can be taken. Also, the substitution of archival and records research should be considered in lieu of testing where possible.

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APPENDIX ONE

SPECIFIC SITES AND ISOLATED FINDS

APPENDIX ONE

SPECIFIC SITES AND ISOLATED FINDS

INTRODUCTION

The appendix is reserved for specific information on the cultural manifestations relocated or discovered during the archaeological survey of the 2,200 ac tract at the Fort Benning Military Reservation. These cultural manifestations, or occurrences, are divided into isolated finds and sites. The definitions for both are provided below.

An isolated find is considered a cultural manifestation of less than three artifacts. Such a small number of artifacts is insufficient data to determine significant cultural activity, and is furthermore indicative of very limited activity. Only one isolated find, I.F. 34, was an exception to this rule. Here, the isolated find consisted of three flakes found wholly within the bounds of historic site 9Ce144. Because 9Ce144 was located almost completely within a plowed field and an adjacent disturbed area, and because the area was scoured for artifactual material, three flakes were considered an accurate limit of the maximum prehistoric material that could be recovered. Because other cultural manifestations with three or a comparable number of flakes were found in more vegetated settings, one could not assume that the number of artifacts recovered represented the maximum limit of artifacts recoverable from those areas.

With that one exception, cultural manifestations with three or more artifacts were considered sites, and sites within the 2,200 ac project area included prehistoric lithic scatters, prehistoric lithic and ceramic camps, historic home sites and historic scatters, farm ponds, and a mill site. All sites, either prehistoric or historic, are described briefly in the appendix, after which recommendations for further work are made for each site. The nature of these recommendations depends upon the artifact concentration and the amount of site disturbance. The artifacts recovered from each site are then presented in tabular form, immediately after each site description and recommendation. Within each table, the artifacts are divided into significant material groups, and the manner of their recovery is recorded: general surface collection, 2 m by 2 m surface collection units, or shovel pits.

Isolated finds are not described in the appendix. The artifacts that comprise isolated finds are listed on Table 6 within the main body of the report.

It will be apparent after a brief inspection of the appendix that several NWR site numbers and isolated find numbers have been eliminated. NWR site numbers and isolated find numbers were assigned consecutively in the field, and when the cultural materials represented by such numbers were combined with materials from other temporary NWR sites or with previously existing sites, these vacated numbers were not reassigned so as to avoid confusion. Whenever such numbers occur, they have been adequately identified. All sites retained in the sequence of field numbers have been assigned State of Georgia permanent site numbers, and the site forms have been submitted to ASB and the State.

ARTIFACT CATEGORIES

Mention has been made of the significant material groups into which each artifact recovered has been placed. The major groupings of artifacts into prehistoric lithics and ceramics, historic ceramics, glass, metal, and miscellaneous artifacts, must, of course, be broken down into much finer categories in order to have temporal and functional significance. These finer categories, simply identified on each artifact table, must in some instances be explained if their meaning is not generally accepted. In other instances, illustrations give definition to the artifact types. For example, the projectile points recovered from the survey are shown on Figure 1-1.

There are, however, some clusterings of categories and traits that are not readily distinguishable and must be identified by the artifact analysis to avoid ambiguity. Among the artifacts recovered during this survey, the problem clusterings are found within the following major artifact groups: prehistoric lithics, and historic ceramics and glass. The clusters within each group will be discussed below and illustrations are provided of historic ceramics and glass.

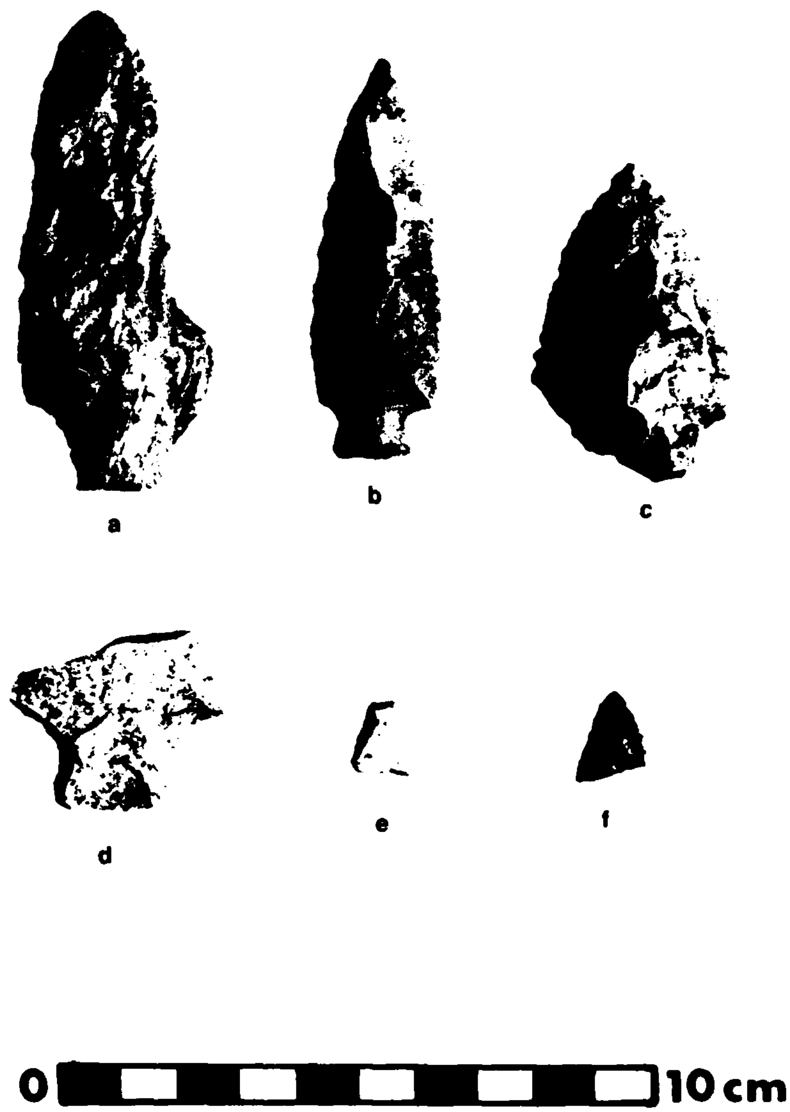

FIGURE A1. IDENTIFIABLE PROJECTILE POINTS AND POINT FRAGMENTS. a) hafted knife: 9Ce165; b) stemmed large blade, Late Archaic to Middle Woodland: I.F. 13; c) stemmed triangular and shield-shaped, medium size, broad, Archaic to Early Woodland: I.F. 9; d) stemmed triangular and shield-shaped, medium-large, medium-wide, Archaic to Early Woodland: I.F. 39; e) Hamilton, Woodland to Mississippian: 9Ce51; f) Madison, Late Woodland to Mississippian: 9Ce135.

NWR

Prehistoric Lithics

Primary, Secondary and Tertiary Flakes

Primary, secondary and tertiary flakes are distinguished by the amount of cortex (i.e., weathered surface) retained on the dorsal side of each flake. These three types of flakes represent residue from lithic tool manufacture and maintenance activities. The process of lithic tool manufacture has been termed a lithic reduction process; the process begins with the selection and procurement of raw material (i.e., pebbles or cobbles). The 'initial preparation' follows and entails the removal of the cortex prior to further reduction. This step is represented archaeologically by primary flakes, which retain more than 50 percent cortex on their dorsal surface. 'Secondary preparation' is characterized by generally smaller flakes than those which would be classified as primary flakes. Secondary flakes have less than 50 percent but more than 10 percent cortex present. These flakes are produced during the manufacture of roughouts or other forms indicative of an intermediate position between the raw material and the finished product. Tertiary flakes, marked by less than 10 percent or no cortex, result from the process of finishing implements, or from creating a working edge on flakes.

Unmodified and Modified Flakes

An 'unmodified' flake either shows no evidence of utilization, or displays irregular edge wear or damage in the form of minor and non-contiguous removals which are usually less than one millimeter in size. The edge wear or damage can be the result of post depositional modification (e.g., excavation, screening). Obversely, 'modified' flakes exhibit definite signs of use: the nicks along the edge, while not contiguous, are much more common, and usually greater in length than one millimeter in size. The distinction between use wear marks and retouching is usually difficult to make, however; therefore, retouched flakes, or those exhibiting deep and contiguous nicking along one or more edges, are lumped with modified flakes.

Cores, Blocky Debris

Cores are chunky fragments of chipped stone that have either a single or a multi-faceted striking platform(s). They are usually ovoid or discoidal in shape. Cores have definite flake scars as the result of numerous removals. Blocky debris can, at first glance, resemble cores (and can, in some cases, be exhausted cores), but there are significant morphological differences between them. Blocky debris is irregular-shaped rocks without identifiable flake scars, even though such rocks usually have numerous facets. Even though they have no discernible flake scars, it is presumed that they were modified by man in some way, owing largely to the number and small size of the individual facets.

Historic Artifacts

Historic ceramic sherds were separating into the categories of pearlware, whiteware, ironstone, yellowware, stoneware, hotelware and porcelain in accordance with paste color and hardness and glaze composition. There are, however, a few groupings that present identification problems to researchers, and these need to be defined. One such clustering is pearlware, whiteware, ironstone; another is porcelain and hotelware.

Pearlware, Whiteware and Ironstone (Figures 1-2 and 1-3)

Pearlware, whiteware and ironstone form a sort of continuum of fine earthenwares spanning the 19th century. Although, for example, pearlware and ironstone are unlikely to be confused, pearlware and whiteware, or whiteware and ironstone, are sometimes difficult to distinguish. For this reason, the criteria determining their separation must be established.

Pearlware, which had an approximate span of 50 years (1770s to 1820s; Noel Hume, 1970:130-131; 1973), has been defined by Price (1979:14) as those vessels that "in addition to the blue color in the puddled glaze, exhibit an overall blue or blue-green cast generally visible on the entire vessel surface."

Whitewares replaced pearlwares as the most popular American ceramics during the 1820s and continued to be prominent until sometimes past the mid 19th century. Ironstone, though first created in 1813 in Britain, was not popular in the United States until mid-century, after which it gradually replaced whitewares (Walker 1971:123; Mathews 1979:40, 60).

Although many researchers feel that a suitable distinction between whiteware and ironstone is difficult, if not impossible to maintain (Lofstrom 1976:23; South 1974:248; Price 1979:11-12), a method has been devised by which the distinction can be made. Using the technique devised by Mathews (1979:39) in the analysis of European ceramics from the Fort St. Jean Baptiste replication site, whiteware and ironstone were separated according to paste hardness. A scratch test with a 10-penny wire nail was employed in making the distinction: if the nail scratched the paste, the sherd was considered whiteware; if not, ironstone. Although South (1974:247-8) and Price (1979:11-2) have cautioned that the criterion of paste hardness may not always be suitable for determining the distinction, this method has been employed with satisfactory results in the analysis of historic ceramics from excavations at the old Centenary College campus in Jackson, Louisiana (Swanson 1979, 1980a), at Marston House in Clinton, Louisiana (Swanson 1980b) and at a few archaeological sites in the Ouachita Mountains (Swanson 1980c).

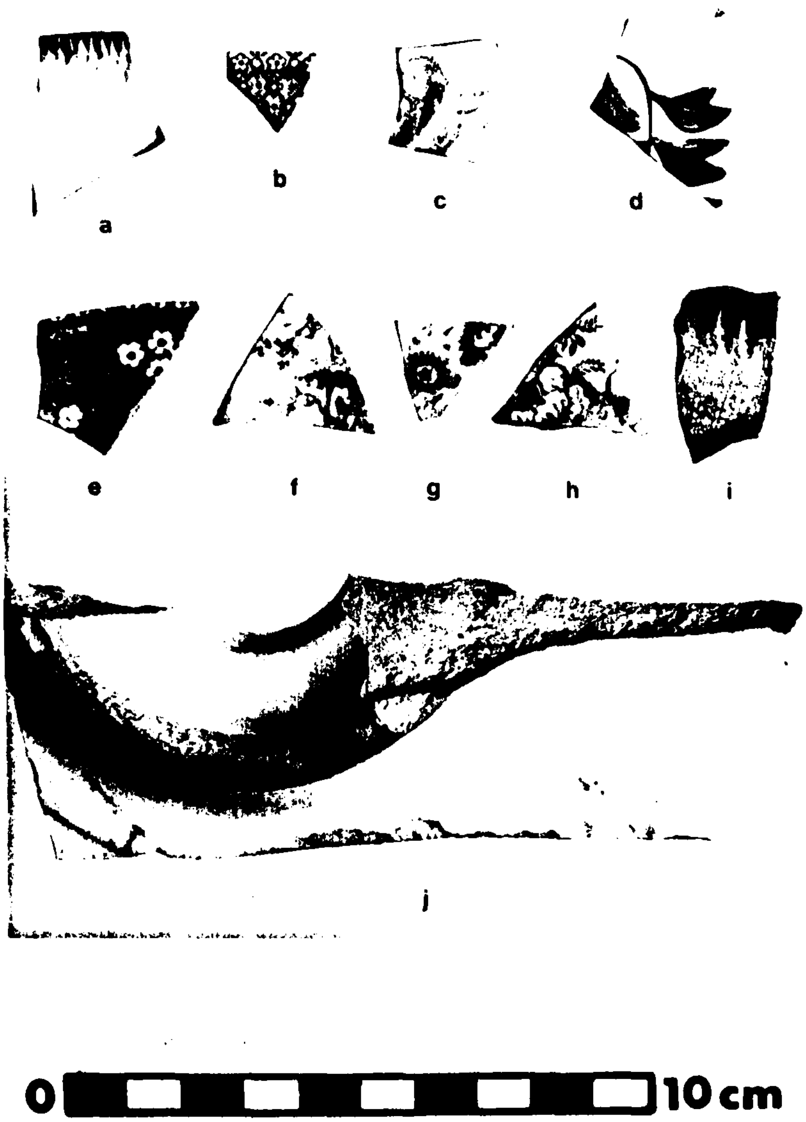

FIGURE A2. HISTORIC CERAMIC ARTIFACTS. a) ironstone, blue feather-edged: 9Ce137; b) whiteware, purple transfer-print: 9Ce140; c) whiteware, undetermined blue decoration: 9Ce140; d) ironstone, underglaze polychrome, hand-painted: 9Ce142; e) ironstone, blue stippled transfer-print: 9Ce144; g) ironstone, blue non-stippled transfer-print: 9Ce145; h) whiteware, brown stippled transfer-print: 9Ce150; 1) whiteware, blue shell-edged: 9Ce150; j) stoneware, butter churn fragment: 9Ce146.

NWR

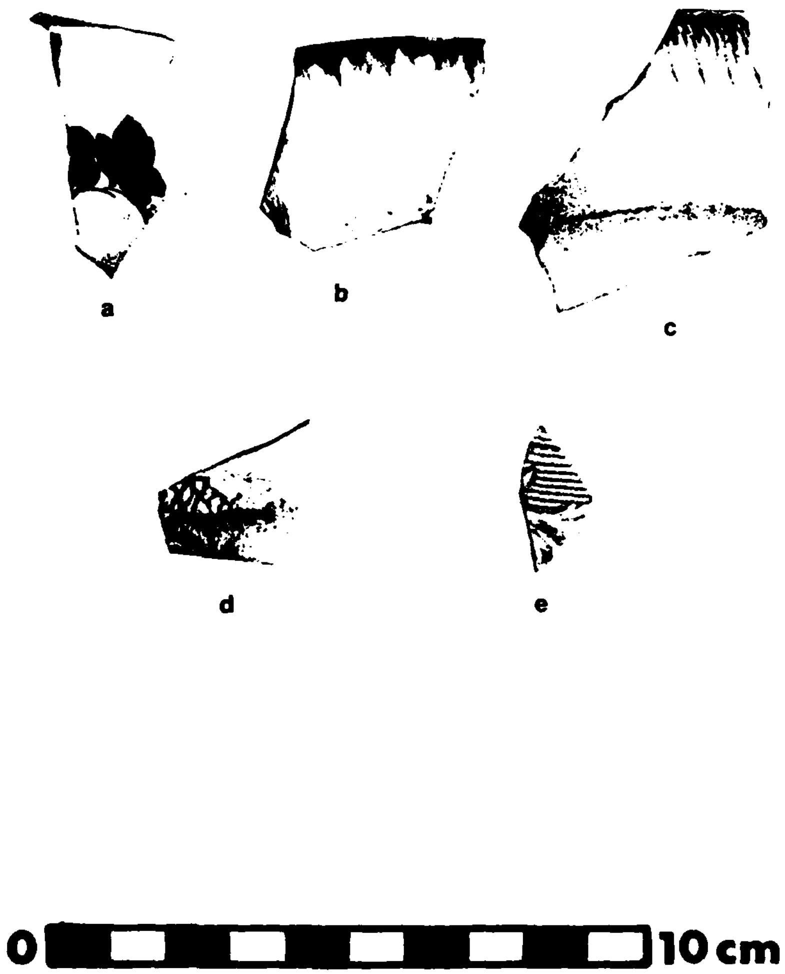

FIGURE A3. HISTORIC CERAMIC ARTIFACTS. a) ironstone, polychrome floral decoration: 9Ce160; b) whiteware, blue shell-edged: 9Ce161; c) whiteware, blue feather-edged: 9Ce161; d) whiteware, blue stippled transfer-print: 9Ce161; e) ironstone, blue non-stippled transfer-print: I.F. 19.

NWR

Porcelain and Hotelware

The last major distinction to be made between the historic ceramics represented in the collection, is between porcelain and hotelware. Although both are white-bodied vitreous ceramics, a distinction can be made on the basis of sherd thickness. Porcelain vessels are consistently thinner than hotelware sherds (Nelson 1971:141). Porcelain has a venerable history and is found throughout the time span represented by the historic sites at Fort Benning. Hotelware is a relatively recent American innovation that was created in 1888 and became increasingly more popular with time (American Vitrified China 1946:7-8).

Glass Containers: Manufacturing Techniques and Color (Figure 1-4)

Glass container fragments from the 19th century are much better temporal indicators than historic ceramic sherds. From the popularization of the three-piece mold after 1810 (Lorrain 1968:38) to the patent of the Owen's Automatic Bottle Machine in 1903, glass containers were manufactured by a number of different techniques, some of which are represented in the Fort Benning historic collection. Not only are manufacturing techniques significant, but also glass color. Although color is not a secure method of establishing chronology, it can be effective in lieu of other dating techniques.

Nineteenth century glass container manufacturing techniques included a number of methods for forming or shaping the various components of the container, such as the lip, neck, or the base. A method of shaping one component would not necessarily be coterminous with another method for shaping the other portions of the container. For this reason, all of the manufacturing techniques represented in the Fort Benning historic collection are discussed briefly below.

Among the glass manufacturing techniques represented in the collection are: snap case (identified from the condition of the container base); tool applied lip, (identified from the condition of the lip/neck area of the container); and automatic manufacture (identifiable at both ends). The vestiges of the earliest 19th century techniques for finishing bottles, the rough pontil mark and the laid-on-ring, common to about 1850 (Lorrain 1968:40), are not found in the present collection.

The snap case was devised as an alternative to the pontil rod. Although the snap case was invented as a way to hold the medial portion of a bottle while reheating and shaping the lip and neck, evidence of its use is most readily found on the base of a glass container. A snap case-finished bottle will have a base unmarred by either a pontil mark or the circular, usually off-center plug employed in automatic bottle manufacture. The use of a snap case is commonly assumed to extend from about 1857 to shortly after the turn of the century (Lorrain 1968:40).

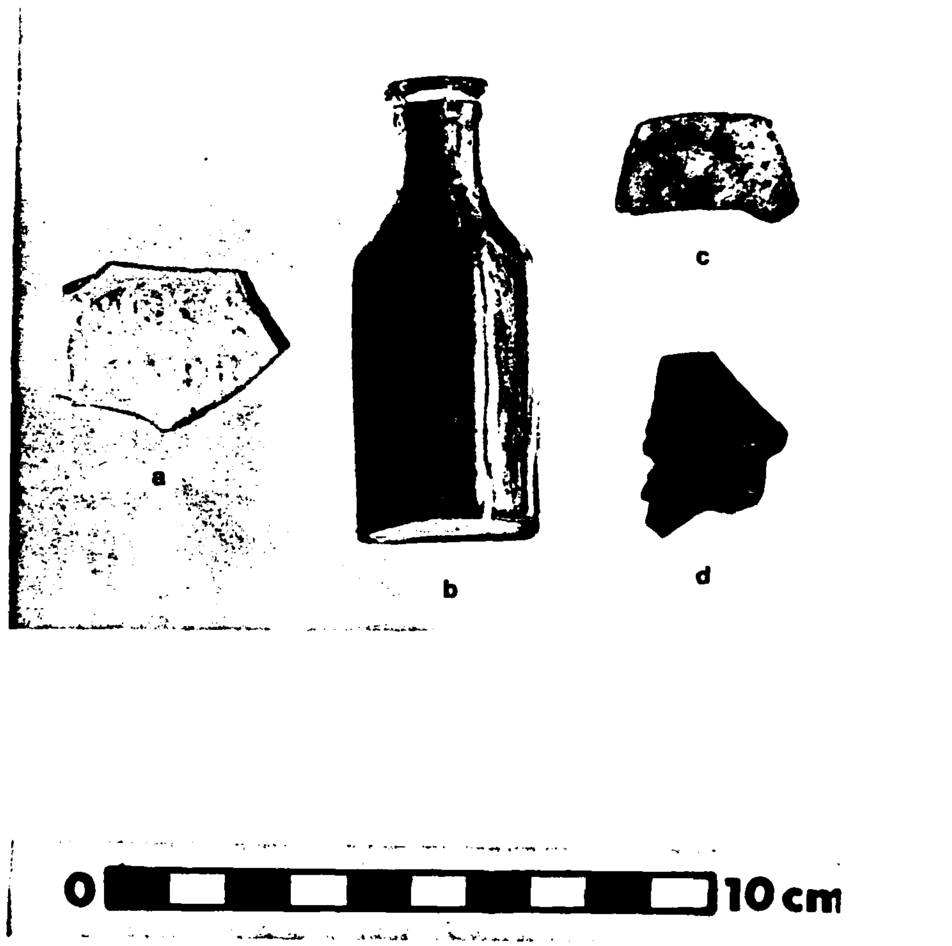

FIGURE A4. HISTORIC GLASS ARTIFACTS. a) patent medicine bottle fragment: 9Ce140; b) snap case manufactured bottle: 9Ce145; c and d) bottle fragment, tool-applied lip: 9Ce161.

NWR

The tool applied lip is identified by an examination of the glass container opening. The tool applied lip is found on bottles that have been reheated and, after a near-molten glob of glass has been applied, reshaped by a lipping tool. This method was employed between c. 1850 and c. 1913 (Lorrain 1968:40; Newman 1970:74).

Automatic manufactured bottles, postdating the 1903 patent for the Owen's machine, are readily identifiable by the usually off-center round or oval plug at the base, and bottle seams that extend to the extreme edge of the bottle opening. Most of the glass container fragments in the Fort Benning collection were of automatic manufacture.

The use of color as a dating technique for glass containers has been much maligned (Lorrain 1968:43). Still, if the liabilities of this technique are understood, it can provide some indication of a general date that might not otherwise be available from small body fragments. The most temporally significant colors for glass containers in the present collection are dark green, aqua, amethyst and 'clear.' Dark green (black or opaque), the natural color of most bottle glass, was a common bottle color as late as about 1885 (Newman 1970:74). Aqua bottles are generally associated with the 19th century and early 20th century, though the use of this color is also associated with certain types of glass containers, such as Mason jars, still being made today. The use of manganese oxide as a decolorizer led to glass that with age and exposure to the sun would turn amethyst. The use of manganese oxide was prevalent between the 1880s and the 1920s (Kendrick 1963:59; Newman 1970:74). Clear glass, the kind most commonly found today, is created by the use of selenium, a much more stable decolorizer than manganese oxide (Newman 1970:74). Selenium came into common use in the United States during World War I, when manganese was in short supply. Although glass color has been identified for most specimens, if no color designation has been assigned, it can be assumed that the color was 'clear.'

Small bottle body-fragments lacking any of the diagnostic manufacturing traits mentioned above, can also be dated roughly by the condition of the glass surface. A pebbly surface (or one that looks like hammered metal), was formed in a contact mold, popular from after 1810 to 1870 (Lorrain 1968:41). Bottles were made after this period with a chilled iron mold and had smooth exteriors.

9Ce134 (NWR 3):

9Ce134 is a small lithic scatter concentrated along the edge of the first terrace west of Sally Branch and north of an unnamed intermittent stream. The site is about 30 m from Sally Branch, and is currently wooded with pines and mixed hardwoods. Shovel pitting was necessary to delimit the boundaries of the site since a dense leaf and pine needle cover obscured the surface. There has been little erosional disturbance to the site since the ground slope in the vicinity of the site is about three percent. There has also been minimal disturbance caused by activities associated with adjacent historic site 9Ce155.

There was litt'e subsurface definition to the site; artifacts were recovered from the top 10 to 15 cm below the sur^face. There were no apparent midden deposits. This, plus the extremely low density of artifacts, precludes any recommendations for further testing.

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Lithics				
chert				
unmodified tertiary flakes			8	8

NWR 4:

NWR 4 has been eliminated.

9Ce135 (NWR 5):

This is a low density, large lithic scatter, eroding out from a tank trail on a ridge crest, over a distance of about 300 m north to south. Conforming to the approximate width of the ridge crest, the site is only about 25 m wide. Disturbance to the site has occurred from armored vehicle traffic. The predominant vegetation at the site is now pine.

(9Ce135 continued)

Artifacts were found in two shovel pits to a depth of 30 cm. However, the artifact density was very low, both in the two shovel pits and from the surface. No recommendations are offered for further testing.

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Lithics				
chert				
unmodified flakes				
primary	2			2
secondary	1			1
tertiary	30	11	7	48
projectile point (Madison)		1		1
quartz blocky debris	1			1
quartzite hammerstone	1			1
SUBTOTALS	35	12	7	54
Ceramics				
plain body sherd, sand/ mica-tempered		1		1
TOTALS	35	13	7	55

NWR 6: NWR 6 has been eliminated. It is now part of 9Ce93.

9Ce136 (NWR 8):

9Ce136 is a prehistoric lithic site with no apparent midden deposits. The site is located on a gently sloping ridge nose adjacent to unnamed tributary of Sally Branch. The site presently is covered in grasses and a few small pines. Because surface visibility is nil, site size was delimited by shovel pitting. One shovel pit, enlarged to 40 cm by 40 cm, was taken to a depth of about 65 cm below the surface; flakes were found to a depth of about 65 cm. Site disturbance is minimal; one possible munitions crater is situated on the east side of the site.

(9Ce136 continued)

The depth of artifacts at 9Ce136 was unusual for lithic sites in the project area, and is probably due to colluviation. No further work is recommended.

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Lithics				
chert				
unmodified tertiary flakes			6	6
quartz				
unmodified primary flakes			1	1
TOTALS			7	7

9Ce137 (NWR 7):

9Ce137 is an historic house site yielding ceramics, glass, and metal artifacts. Cultural material is spread about 120 m north to south along the east side of Box Springs Road. Although artifacts are scattered downslope along the road, the actual house site is situated on a relatively level ridge crest. An intact area of dark midden-like soil was found that corresponds to a small cluster of shrubs that have outstripped the surrounding vegetation. No structural remains, however, were evident. The midden-like area is about 15 m by 10 m.

Midden-like soil and deposits were far enough east of the Box Springs Road that significant damage was not done to the house site itself. The house site is of a late 19th century - early 20th century date, and is depicted on the 1924 soil map of Chattahoochee County. Although cultural deposits may be present, it is unlikely that excavation of this site would contribute significant data. Therefore, we recommend no further work.

(9Ce137 continued)

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Historic Ceramics				
Whiteware, undecorated	4	1		5
Ironstone, undecorated	6		2	8
blue feather-edged			1	1
Stoneware, lead glaze		1		1
undetermined glaze, green slip	1			1
SUBTOTALS	11	2	3	16
Glass				
Soft drink bottles, automatic manufacture	1			1
Unidentified bottles, smooth body fragments				
aqua	3		1	4
clear	3		2	5
brown	1			1
Unidentified bottles Lip/neck fragment, automatic manufacture				
aqua	1			1
unidentified manufacture				
clear	1			1
Decorative vessel fragment, amethyst			1	1
Depression glass fragment, red		1		1
Decorative bead	1			1
SUBTOTALS	11	1	4	16
Metal				
iron machine-cut nails			3	3
iron wire nails			1	1
SUBTOTALS			4	4
Miscellaneous				
plastic button	1			1
pressed wood fragment	1			1
SUBTOTALS	2			2
TOTALS	24	3	11	38

NWR 9: NWR 9 has been eliminated.

NWR 10: NWR 10 has been eliminated and is now Isolated Find 27.

9Ce138 (NWR 11):

This site is a prehistoric lithic scatter located on a large ridge nose sloping to the southeast. No diagnostic artifacts were recovered. Three-quarters of the total number of artifacts came from a six square meter area. The site corresponds to the unimproved dirt access road that runs down the ridge nose. Sheet erosion is extensive and vegetation is sparse consisting of thin grasses and a few pines.

This site is too small and disturbed to recommend any further testing.

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Lithics				
chert				
unmodified tertiary flakes	19	15		34
modified tertiary flakes		1		1
quartz				
unmodified primary flakes	1			1
TOTALS	20	16		36

9Ce139 (NWR 12):

9Ce139 is a very limited lithic scatter (four flakes found on the surface) situated on a gently sloping ridge nose. Both slope wash and vehicular traffic have impacted the site. Vegetation (grasses and a few pines) was spotty, affording on occasion good surface visibility. The surface was inspected and shovel pits were placed in order to recover artifacts.

(9Ce139 continued)

The site was limited to the surface; shovel pits did not yield any artifacts. This, plus the low artifact density and site disturbance, must preclude any recommendation for further work.

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Lithics				
chert				
unmodified tertiary flakes	4			4

NWR 13: NWR 13 has been eliminated and is now Isolated Find 33.

9Ce140 (NWR 14):

9Ce140 is an historic house site situated on a ridge crest. The house is gone, but three depressions (one large one) and an apparent chimney fall, mark the location of the former structure. The large depression is probably the remains of a root cellar. Sandstone slabs mark the foundation of the structure. Downhill to the north-west is a dump containing rusty cans and glass fragments. A fallen utility pole is still within the immediate vicinity of the house site. To the southeast, several Wildlife Game Management areas have been cleared and plowed. Surficial artifact density is quite high in these plowed areas.

Although the site has not been seriously disturbed, it is too recent for National Register eligibility. We would not recommend further testing.

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Historic Ceramics				
Whiteware				
stippled transfer-printed, purple		1		1

AD-A136 248 AN INTENSIVE SURVEY OF A 2200 ACRE TRACT WITHIN A PROPOSED MANEUVER AREA A..(U) NEW WORLD RESEARCH INC POLLOCK LA P M THOMAS ET AL. 1983 CX5000-2-0087 3/3

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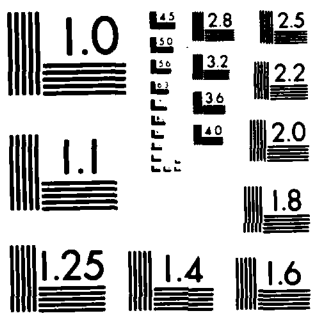
1.0
2.8
2.5
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1.8
1.25
1.4
1.6

(9Ce140 continued)

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Glass (cont.)				
electric line insulator, aqua	1			1
pane glass	3			3
SUBTOTALS	30	12	2	44
Metal				
unidentified iron and copper fragment	1			1
Miscellaneous				
brick fragment		1		1
TOTALS	47	17	2	66

9Ce141 (NWR 15):

9Ce141 is a small prehistoric lithic scatter of very sparse artifact density located on edge of a ridge crest. Surface visibility was poor; therefore, shovel pitting was required. The vegetation found was pine and some hardwoods; there was little underbrush. Disturbance, through either human or natural agents, has been very minimal.

Though the disturbance to the site is very little, the very sparse artifact density would indicate a site too small to merit further testing.

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Lithics				
chert				
unmodified tertiary flakes			3	3

(9Ce141 continued)

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Historic Ceramics (cont.)				
undetermined, blue decoration		1		1
Ironstone				
undecorated	14	1		15
Porcelain				
undecorated	1			1
figurine fragment	1			1
Stoneware, lead glaze		1		1
SUBTOTALS	16	4		20
Glass				
Wine bottle, pebbly surface, body fragment, dark green		1		1
Post-1920 medicine bottle, brown	1			1
Soft drink bottle fragment, automatic manufacture				
Coca-Cola	1			1
Chero-Cola	2			2
unidentified	1	1		2
Condiment bottle fragment	1			1
Unidentified bottle body fragments,				
smooth surface				
aqua	2	1		3
amethyst	7	1		8
blue	1		1	2
brown		1		1
green	1			1
clear	4	1	1	6
pebbly surface				
aqua		1		1
base fragment				
snap case, aqua	1	1		2
automatic, clear	1			1
lip/neck fragment, unidentified manufacture, clear		1		1
pressed glass container fragment		1		1
milk glass container fragments	3	2		5

9Ce142 (NWR 16):

This site, located on a ridge crest, is the remains of an historic structure, either a small house or a shed. Recent asphalt shingles were found on the surface in a small concentration. Historic ceramics were recovered from the adjacent unimproved dirt access road. There was no indication of structural foundations, wells or cellars. The vegetation in the vicinity of the site is sparse, limited to a thin grass cover and small pines. Surface visibility was good. There appeared to be no subsurface definition to the site; shovel pits revealed neither structural remains nor artifactual concentrations. All artifacts were recovered from the immediate vicinity of the shingle concentration or along the unimproved dirt access road located about ten meters to the north.

There are no recommendations for further testing at 9Ce142. The structural remains appear to be too recent to be eligible for the National Register and are not of themselves demonstrably significant.

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Historic Ceramics				
Ironstone				
undecorated	5			5
underglaze polychrome, hand-painted		1		1
Stoneware				
lead glaze, green slip	1			1
SUBTOTALS	6	1		7
Metal				
Iron				
machine-cut nail	1			1
Tin alloy				
can fragment	1			1
SUBTOTALS	2			2
TOTALS	8	1		9

9Ce143 (NWR 17):

This site is a small prehistoric lithic scatter (three flakes) situated on a ridge crest. The site has been heavily impacted by tank trails that provide excellent surface (and subsurface) exposure. The vegetation is very sparse: a thin grass cover and a few small pines.

There are no recommendations for further testing, due to heavy disturbance to the site, as well as the scarcity of the artifactual material.

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Lithics				
chert				
unmodified tertiary flakes	2		1	3

9Ce144 (NWR 18):

9Ce144 is an historic house site with material scattered over a 65 m by 30 m area on the crest of a ridge adjacent to Red Diamond Road. The house site is marked by the presence of a few brick fragments and ornamental trees (cedar); no intact foundations or even discernable rubble pile from the chimney fall were discovered. There has been recent plowing for a Wildlife Game Management area just to the north of the house site. A fire break also crosses the site from east to west. Heavy equipment has disturbed a part of the site situated at the summit and the house site itself. Glass and historic ceramic sherds have been recovered from all of these disturbed areas. A few prehistoric flakes were found in the immediate vicinity of the house site. Because of the sparsity of prehistoric artifacts, these cultural remains are identified in this report as Isolated Find 34.

The site appears to date to late 19th century - early 20th century. The historic artifact assemblage is larger than most historic sites in the project area. The site, however, has been badly disturbed, and the immediate vicinity of the former house has no integrity. We do not recommend further testing.

(9Ce144 continued)

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Historic Ceramics				
yellowware				
undecorated	1			1
annular decoration	1			1
ironstone				
undecorated	13	3		16
stippled transfer-printed, blue	1			1
non-stippled transfer-printed, blue	1			1
underglaze, hand-painted, floral decoration	1			1
annular decoration	3			3
hotelware				
undecorated	1			1
porcelain				
undecorated	4			4
stoneware				
undecorated	2			2
lead glaze, green slip	1			1
lead glaze, black slip	1			1
SUBTOTALS	30	3		33
Glass				
mason jar body fragment, smooth surface, aqua	1			1
unidentified bottle				
body fragment, smooth surface,				
brown	3			3
clear	2			2
lip/neck fragment, automatic, clear	1			1
milk glass, vessel fragment	1			1
zinc cap liner	2			2
Depression glass vessel, fragment	2			2
unidentified decorated glass fragment	1			1
melted glass fragments, clear	2			2

(9Ce144 continued)

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Glass (Cont.)				
pane glass	2			2
SUBTOTALS	17			17
Miscellaneous				
brick fragments	1			1
TOTALS	48			51

9Ce145 (NWR 19):

This site is an historic house site on a ridge crest just south of Red Diamond Road. No ornamental trees were situated in the vicinity. The site is extremely disturbed by heavy vehicular traffic, recent timbering, an unimproved access road, fox holes, shell craters, an army bunker, as well as some bulldozing. The historic artifacts were found on exposed surfaces, especially the access road surface and exposed areas southwest of the road. The summit of the ridge crest has been the most badly disturbed. Apparently the summit was used as a fortified command post during military exercises. Only one depression on the summit appears to be related to the historic structure. Two sandstone slabs are adjacent to the depression.

The site has been too severely disturbed to recommend any further testing.

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Historic Ceramics				
whiteware				
undecorated	4			4
ironstone				
undecorated	17	1		18
non-stippled transfer-printed, blue	1			1
undetermined decoration	1			1

(9Ce145 continued)

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Historic Ceramics (cont.)				
hotelware				
undecorated	1			1
porcelain				
undecorated	1			1
unidentified fragment	1			1
stoneware				
lead glaze, brown slip	1			1
salt glaze, undecorated	2			2
SUBTOTALS	29	1		30
Glass				
unidentified jar, body fragment, smooth surface,				
aqua	1			1
clear	1			1
unidentified bottle body fragment, smooth surface,				
aqua		1		1
amethyst		1		1
clear	3			3
whole medicine bottle, snap case		1		1
calibrated vessel fragment		1		1
milk glass, vessel fragment	1			1
zinc cap liner fragment	3			3
pane glass	1			1
SUBTOTALS	10	4		14
Metal				
unidentified iron fragment		1		1
Miscellaneous				
brick fragments		1		1
TOTALS	39	7		46

9Ce146 (NWR 20):

9Ce146 is an historic artifact scatter situated on a ridge nose adjacent to Red Diamond Road. The site is in a wooded area of pines and mixed hardwoods. Ornamentals (holly and live oak) are present. Disturbance consists of a fire break and the passage of tracked vehicles. Surface visibility is poor due to leaf cover. One depression in the vicinity may be related to the historic site. Two large beams are present, and both have been partially burned. One large sandstone slab is adjacent to the beams; additional sandstone slabs were also noted. A brick fragment was also found. All of these items suggest a structure. The artifacts recovered include a large fragment of a butter churn, a rusted sardine can, and a metal bowl.

Disturbance to the site does not appear to be extensive; site integrity is probably good. However, the artifactual assemblage is surprisingly sparse for a house site. No further testing appears warranted.

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Historic Ceramics				
ironstone				
undecorated			1	1
stoneware, lead glaze				
(butter churn fragment)		1		1
SUBTOTALS		1	1	2
Glass				
unidentified bottle				
body fragment, smooth surface, brown			1	1
melted glass fragments, clear			1	1
pane glass			1	1
SUBTOTALS			3	3
Metal				
iron				
machine-cut nails			1	1
unidentified fragments			1	1
tin alloy				
tobacco can			1	1
SUBTOTAL			3	3
Miscellaneous				
brick fragments			1	1
TOTALS		1	8	9

9Ce147 (NWR 21):

9Ce147 is a large historic house site situated on a ridge crest immediately adjacent to Red Diamond Road. An artifact scatter associated with the site extends to the south, along what is now an unimproved dirt access road and in a series of plowed zones established as a Game Management area. The structural remains consist of a chimney fall and a pile of sandstone slabs. A line of shovel pits through the house site produced historic artifacts, mostly glass container fragments. The depressions at the house site may be the remains of cultural features (i.e., privies, wells, etc.) or they may be the result of military disturbance. Ornamental trees include privet and a large shade oak. Most of the artifacts recovered from the site are south of the actual house site along the access road and the Game Management areas. Surface visibility in this area was good.

The artifacts suggest an early 20th century occupation. The house site itself has suffered minimal disturbance, although there is disturbance around it. There is, however, nothing particularly unique about the site and we recommend no further work.

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Historic Ceramics				
whiteware				
undecorated	3			3
ironstone				
undecorated	11	3		14
porcelain				
undecorated	1			1
stoneware				
lead glaze, undecorated	1	1		2
lead glaze, green slip	1			1
SUBTOTALS	17	4		21
Glass				
unidentified bottle				
body fragment, smooth surface,				
dark green	1			1
clear	2		3	5
pane glass	1			1
SUBTOTALS	4		3	7
Metal				
iron				
machine-cut nails			2	2
wire nails			1	1

(9Ce147 continued)

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Metal (cont.)				
tin alloy				
unidentified fragment			1	1
SUBTOTAL			4	4
Miscellaneous				
brick fragment tempered with charcoal	1			1
rubber sink or bathtub stopper	1			1
SUBTOTAL	2			2
TOTALS	23	4	7	34

9Ce148 (NWR 22):

9Ce148 is an earthen dam across an unnamed intermittent stream. No other structures are apparent. The dam is perhaps associated with 9Ce147. Two piles of sandstone flank a gully on the western edge of the dam. Although the dam has been cut through the center, during the period of its use water probably left the impoundment along the west side. In plan, the dam is linear.

This site might have been used as a mill dam. This, however, is conjecture; aside from the sandstone piles, we have no other evidence. The small size of the dam and impoundment (and the small size of the intermittent stream behind it) would suggest a farm pond rather than a mill. In either case, it is unlikely that the site would yield significant data so we recommend no further work.

9Ce149 (NWR 23):

An historic earthen dam, 9Ce149, was almost surely an agricultural or live-stock pond located on an unnamed ephemeral stream. No artifacts were evident. The length of the dam is about 35 m. In plan, the dam is crescent-shaped.

(9Ce149 continued)

No further testing is recommended due to the lack of significant functional activities and artifactual concentrations associated with the dam.

NWR 24: NWR 24 has been eliminated and is now Isolated Find 38.

9Ce150 (NWR 25):

9Ce150 is an historic ceramic scatter on a level ridge crest above Sally Branch. The crest has been timbered recently; at present, felled trees cover the site. Other vegetation consists of weeds and small brush. The only surface visibility is along a timber road and a few exposed spots. Disturbance from timbering is moderate. An artifact collection was made from the surface and also shovel pits. No structural remains or depressions were evident. One feather-edged sherd was found in a shovel pit downslope; otherwise, cultural material appears to be limited to the crest.

The site, probably a former house site, does not appear to have any extant structural remains. Shell-edged whiteware sherds and two small pearlware sherds were recovered from the site, indicating an early to mid-19th century date. However, further archaeological work is not recommended because of low artifact density and the absence of structural remains or subsurface deposits.

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Historic Ceramics				
pearlware				
undecorated			2	2
whiteware				
undecorated	1		2	3
blue shell-edged			1	1
stippled transfer-printed, brown	1			1
undetermined color	1			1

(9Ce150 continued)

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Historic Ceramics (cont.)				
ironstone				
undecorated	1		—	1
SUBTOTALS	4		5	9
Glass				
decorative vessel fragment, clear			1	1
TOTALS	4		6	10

9Ce151 (NWR 26):

9Ce151 is a prehistoric lithic and ceramic site situated on a small terrace adjacent to Hollis Creek. Vegetation consists of underbrush and pine. There was no surface visibility. Disturbance to the site is minimal. No midden deposits were discerned in the course of shovel pitting. Although two productive shovel pits were taken to 50 cm below the surface, cultural material was limited to the top 20 cm.

The site is essentially intact. Artifact concentration, however, is sparse, and the site is small. Due to the limited information that could be gathered from testing this site, we would recommend no further work.

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Lithics				
chert				
unmodified tertiary flakes			10	10
modified primary flakes			1	1
quartzite				
unmodified primary flakes			1	1

(9Ce151 continued)

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Lithics (cont.)				
quartzite (cont.)				
unmodified tertiary flakes			1	1
SUBTOTAL			13	13
Prehistoric Ceramics				
plain body sherd, sand-tempered			1	1
TOTALS			14	14

9Ce152 (NWR 27):

9Ce152 consists of a prehistoric lithic scatter situated on a small ridge nose. The area has been extensively timbered and extreme disturbance to the site has resulted from military vehicular traffic. For example, disturbed earth at the site was often piled up to a height of 50 cm. Erosion has been extensive due to the disturbance. The surface visibility, however, was excellent, providing an examination of both original surface and subsurface deposits.

The site is a very small lithic scatter with no diagnostics. This, plus the extremely disturbed nature of the site, precludes any further archaeological testing.

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Lithics				
chert				
unmodified tertiary flakes	7	2		9
modified tertiary flakes	2			2
TOTALS	9	2		11

9Ce153 (NWR 28):

9Ce153 is a prehistoric lithic scatter situated on a ridge nose. Vegetation consists of thin grass cover and pine trees. Disturbance and erosion are minimal. Cultural material was predominantly found near the surface though charcoal was found in two shovel pits at a depth of 20 cm below the surface. The charcoal is probably the result of recent burnings, rather than evidence of cultural activities.

9Ce153 has not been significantly disturbed and in spite of the charcoal, there was no evidence of midden-like soil or deposits. No further work is recommended for the site.

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Lithics				
chert				
unmodified primary flakes			1	1
unmodified tertiary flakes			15	15
modified tertiary flakes	1			1
anvil stone			1	1
quartzite				
mano			1	1
TOTALS	1		18	19

9Ce154 (NWR 29):

9Ce154 is a prehistoric lithic scatter situated on a ridge nose sloping toward Hollis Creek. Fire breaks impact the site, and there has been much erosion, especially pronounced further up the ridge nose. Some of the site material could have washed down from further up the slope. Vegetation at the site now consists of a few small pines and thin grasses. Shovel pits were required to recover cultural material. Artifacts were scarce, and were recovered from the surface, or within 20 cm of the surface (shovel pits were taken to a depth of 40 cm to 45 cm).

(9Ce154 continued)

Due to the scarcity of cultural material, as well as the extremely disturbed nature of the site, no recommendations for further work are tendered.

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Lithics				
chert				
unmodified secondary flakes			1	1
unmodified tertiary flakes			1	1
quartzite				
unmodified primary flakes			1	1
mano	1			1
TOTALS	1		3	4

9Ce155 (NWR 30):

9Ce155 is an historic mill site situated on the floodplain of Sally Branch. The site consists of an earthen dam and mill sluice on the western side of the dam. Adjacent to the mill race and sluice is a part of a mill turbine (a series of circular "saws" attached to a single rod, used to separate cotton fibers from seeds). Also present are the remnants of a barbed wire fence. At present, the dam has been cut in the middle to facilitate the flow of Sally Branch.

The mill dam and sluice have not been significantly disturbed, and is an example of a little documented phase of the economics of the Fort Benning area. For this reason, and others outlined in Chapter Nine, we recommend further work at the site in the form of archival study and detailed mapping.

9Ce156 (NWR 31):

9Ce156 is a prehistoric lithic scatter situated on a very gentle slope. Site disturbance consists of tank and vehicle trails and logging activities. The current vegetation at the site consists of a thin grass cover and some small pines; the surface visibility was very good, and the ground has been disturbed and churned up enough to provide a good indication of subsurface artifact concentration. Only one shovel pit was placed in the site to determine the soil stratigraphy.

(9Ce156 continued)

Due to the extremely disturbed nature of the site, 9Ce156 is not recommended for further testing.

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Lithics				
chert				
unmodified tertiary flakes	4	2		6
quartzite				
unmodified tertiary flakes		1		1
TOTALS	4	3		7

9Ce157 (NWR 32):

A small prehistoric lithic and ceramic concentration, 9Ce157 is located on the first terrace west of Hollis Creek. The site is vegetated with pine and some hardwoods; underbrush is minimal. Erosion is also minimal. Due to the vegetation, shovel pitting was necessary. Ceramics were found only from the center of the site. No midden-like deposits were found.

Despite the presence of a single prehistoric sherd, no further work is recommended.

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Lithics				
chert				
unmodified secondary flakes			1	1
unmodified tertiary flakes			22	22
quart				
unmodified tertiary flakes			1	1
SUBTOTALS			24	24

(9Ce157 continued)

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Prehistoric Ceramics				
plain body sherd, grit/ sand-tempered			1	1
TOTALS			25	25

NWR 33: NWR 33 has been eliminated and is now Isolated Find 39.

9Ce158 (NWR 34):

This site is a prehistoric lithic scatter which is located on a ridge crest. The vegetation consists of sparse grasses and a few pine trees; surface visibility was very good. The area has been disturbed by vehicular traffic since the site is adjacent to unimproved dirt access road.

Due to the extremely limited number of artifacts recovered from this site, and the disturbance to the area, we do not recommend further testing.

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Lithics				
chert				
unmodified tertiary flakes		4		4

9Ce159 (NWR 35):

A small historic artifact scatter, 9Ce159 is associated with Cemetery 49 (Hardison Cemetery). A few historic sherds were found within the fence of the cemetery ground. The cemetery is situated on a ridge crest. Vegetation, aside from a few pines and hardwoods, is thin grasses. Surface visibility is very good.

(9Ce159 continued)

There are no recommendations for further work. The site consists of miscellaneous historic sherds probably deposited in the course of visiting the cemetery.

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Historic Ceramics				
ironstone				
undecorated		3		3
unidentified poly-chrome decoration		1		1
SUBTOTALS		4		4
Glass				
soft drink bottle, body fragment	1			1
unidentified jar, body fragment, smooth surface, aqua	3			3
unidentified bottle				
body fragment, smooth surface,				
amethyst	2			2
brown	4			4
clear	4			4
base fragment, snap case, brown		1		1
milk glass, vessel fragment	1			1
SUBTOTALS	15	1		16
Metal				
tin alloy				
can fragment	1			1
TOTALS	16	5		21

9Ce160 (NWR 36 and NWR 37):

9Ce160 is a two component site consisting of a prehistoric lithic and ceramic scatter and an historic glass and ceramic scatter. The site is situated on a ridge nose. Disturbance to the site has been severe; logging operations have been extensive, especially along the crests. Erosion has occurred due to the logging. Because of disturbance to the site, some artifactual material has been transported to the base of the ridge nose and on the adjacent side of the small neighboring ridge crest. Vegetation is extremely sparse, with a few grasses and very few remaining trees. The ground visibility was excellent, and no historic structural remains or features were discerned. It is apparent that the prehistoric component is almost completely overlapped by the historic component.

There were no midden deposits discerned at the site. This, as well as the extremely disturbed nature of the site, precludes any recommendation for further testing.

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
PREHISTORIC				
Lithics				
chert				
unmodified primary flakes	1	1		2
unmodified secondary flakes	1			1
unmodified tertiary flakes	19	21		40
modified tertiary flakes	1	1		2
SUBTOTALS	22	23		45
Prehistoric Ceramics				
plain body sherd, sand tempered		2		2
TOTALS - PREHISTORIC	22	25		47
HISTORIC				
Prehistoric Ceramics				
whiteware				
undecorated		1		1
ironstone				
undecorated	6	3		9
polychrome annular decoration		1		1

(9Ce160 continued)

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
polychrome floral decoration		1		1
unidentified decoration		1		1
porcelain				
undecorated		1		1
stoneware				
lead glaze		1		1
SUBTOTALS	6	9		15
Glass				
soft drink bottle, body fragments	3			3
unidentified bottle				
body fragment, smooth surface,				
aqua		1		1
amethyst	1			1
clear		1		1
base fragment, automatic manufacture, clear	2			2
milk glass container fragment	1			1
wire mesh-reinforced pane glass	4			4
SUBTOTALS	11	2		13
Metal				
iron				
unidentified fragment	1			1
tin alloy				
condiment can (possibly pepper shaker)	1			1
tobacco can		1		1
unidentified can fragment	1			1
SUBTOTALS	3	1		4
Miscellaneous				
brick fragments	1			1
concrete briquette	1			1
tile cement fragment	1			1
SUBTOTALS	3			3
TOTALS - HISTORIC	23	12		35
TOTALS - ALL	45	27		82

9Ce161 (NWR 38 and NWR 39):

9Ce161 is a three component site. The oldest is a small prehistoric lithic scatter, which yielded a total of five artifacts. The principal occupations appear to be associated with the historic period; two distinctive occupational episodes seem to be present. The oldest of the historic components is clearly a 19th century house site. Although marked by old brick fragments tempered with charcoal and early 19th century sherds (blue shell- edged whiteware, blue feather-edged whiteware, and blue stippled whiteware), subsurface remains of the house site could not be found. However, the possible remains of a 19th century road bed were located within the area of the site. Although running down a slope, and in places resembling a gully, the linear depression had enough regularity in its dimensions to strongly suggest a road bed. The youngest historic component is a relatively recent, 20th century house site, marked by recent ceramic sherds and a large chimney fall.

The site is situated on a gently sloping ridge nose, which has been disturbed by extensive logging. Surface visibility was good; vegetation consisted of sparse grass cover and small pines and erosion was generally limited to exposed areas. Subsurface deposits were exposed due to the vehicular-disturbance.

The site has been extensively disturbed by logging activities and does not merit further examination.

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
PREHISTORIC				
Lithics				
chert				
unmodified tertiary flakes	4			4
quartzite				
small bifacial fragment	1			1
TOTALS - PREHISTORIC	5			5
HISTORIC				
Historic Ceramics				
whiteware				
undecorated	9	2		11
stippled transfer-printed, blue	1	1		2
blue shell-edged		1		1

(9Ce161 continued)

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Historic Ceramics (cont.)				
whiteware (cont.)				
blue feather-edged		1		1
ironstone				
undecorated	13	6		19
red annular decoration	1			1
hotelware				
undecorated		1		1
stoneware				
salt glaze, green slip	1	1		2
red slip	1			1
lead glaze, black slip	1			1
SUBTOTALS	27	13		40
Glass				
dark green wine bottle, body fragment, horizontal striation	1			1
lip/neck fragments, tool-applied	1			1
post-1920 medicine bottle, body fragment, blue	2			2
unidentified bottle				
body fragment, smooth surface,				
aqua	1			1
amethyst	1			1
brown	1			1
base fragment, automatic, brown	1			1
lip/neck fragment, tool applied, aqua	1			1
milk glass zinc cap sealer	1			1
melted glass fragment, clear	1			1
pane glass	2			2
SUBTOTALS	13			13
Metal				
iron				
wire nails	2			2
hinge	1			1
corundium (steel alloy)				
bullet	1			1

(9Ce161 continued)

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Metal (cont.)				
tin alloy				
'Gulf' lubricating can	1			1
small, unidentified can	1			1
SUBTOTALS	6			6
Miscellaneous				
brick fragments	1			1
brick fragment, tempered with charcoal	1			1
leather shoe sole and hell, with shoe nails	1			1
plastic container fragments	2			2
SUBTOTALS	5			5
TOTALS - HISTORIC	51	13		64
TOTALS - ALL	56			69

9Ce162 (NWR 40):

9Ce162, a prehistoric lithic scatter, was located on a slight ridge slope near the confluence of Hollis Creek and an unnamed tributary. The site was found in a plowed Wildlife Game Management Area. The remainder of the site is located in thin grasses adjacent to plowed strips. Primary disturbance to the area is due to slope erosion and plowing for the Game Management Area. One shovel pit was placed in the vicinity of the site. It was taken to a depth of 45 cm below the surface. Due to the total lack of cultural material from the shovel pit, there does not appear to be a significant subsurface component to 9Ce162.

Due to the disturbed nature of the site and the paucity of artifactual material, no recommendations for further work are made.

(9Ce162 continued)

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Lithics				
chert				
unmodified primary flakes	1			1
unmodified secondary flakes	1	2		3
unmodified tertiary flakes	16	6		22
TOTALS	18	8		26

9Ce163 (NWR 41):

This site is a prehistoric lithic scatter situated on a terrace above the confluence of Hollis Creek and an unnamed tributary. Most of the site is located on the first terrace above Hollis Creek, although a small portion of the site extends up to the gentle slope to the west. The area has been heavily logged and disturbed by the movement of heavy machinery. The vegetation is predominantly pine with some underbrush. Ground visibility was minimal, so shovel pits were required to delimit the site.

The site artifact density was too low and area is too disturbed to merit further work.

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Lithics				
chert				
unmodified primary flakes			1	1
unmodified tertiary flakes			8	8
modified tertiary flakes			1	1
SUBTOTALS			10	10

(9Ce163 continued)

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Prehistoric Ceramics				
plain body sherd, sand-tempered			1	1
TOTALS			11	11

9Ce164 (NWR 42):

An historic artifact scatter, 9Ce164 is situated on a ridge crest just north of Red Diamond Road. The site has been heavily impacted by an unimproved dirt access road. Vegetation at the site consists of thin grasses and small pines. The erosion has been extensive along the access road. Among the artifacts found were historic ceramics, metal and coal fragments. The coal fragments were found just east of the access road. If this area was a house site, and not just historic debris, then it appears that the access road has obliterated the house site itself.

Due to the disturbed nature of the site, and the scarcity of artifactual material, no recommendations for further work are tendered.

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Historic Ceramics				
Ironstone				
undecorated	1	4		5
polychrome underglaze, hand-painted		1		1
SUBTOTALS	1	5		6
Glass				
melted glass fragment	1			1
Metal				
Iron				
stove 'eye' ring	1			1
unidentified bar		1		1

(9Ce164 continued)

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Metal (cont.)				
Iron (cont.)				
unidentified fragments	3			3
tin alloy				
can cap		1		1
SUBTOTALS	4	2		6
TOTALS	6	7		13

9Ce165 (NWR 1):

9Ce165 is a prehistoric lithic scatter situated on a ridge crest. The site has been impacted by a dirt access road that runs immediately adjacent to the north/south trending ridge crest. All artifacts associated with the site were recovered from the surface adjacent to the eroded banks on both sides of the road; although shovel pits were placed along transect lines perpendicular to the road, no artifacts were found below surface. Predominant vegetation in the vicinity of the site is currently pine.

There is no subsurface definition to the site and road impact has been very great. Therefore, we recommend no further work at 9Ce165.

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Lithics				
chert				
unmodified tertiary flakes	5	2		7
blocky debris	1			1
hafted knife	1			1
TOTALS	7	2		9

9Ce166 (NWR 2):

Twelve flakes were recovered from 9Ce166, a prehistoric lithic scatter found along a ridge crest access road. The cultural material associated with the site was recovered from the road bed, which afforded excellent surface visibility. Neither surface collection nor shovel pitting beyond the road bed yielded artifacts. The site has been heavily disturbed, not only by the road, but by logging operations in the immediate area. Vegetation in the site vicinity consists of thin grasses and medium-sized pines.

There is no subsurface definition to the site. The impact from road use and logging has been extensive. No further work is recommended.

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Lithics				
chert				
unmodified primary flakes		1		1
unmodified tertiary flakes	7	5		12
quartzite				
unmodified primary flakes		3		3
TOTALS	7	9		16

PREVIOUSLY RECORDED SITES - RELOCATED

9Ce51:

9Ce51 is a dense concentration of prehistoric lithics and ceramics, along the first terrace west of Sally Branch. The site has been fully discussed in Chapter Nine and that discussion will not be reiterated here. We recommend further work because of the composition of the artifactual assemblage, the possibility that the site represents a Woodland period village or base camp in an upland setting, and that fact that discrete concentrations of artifactual materials were identified at the site indicating the possible differential use of the site area. Although no midden was located, its possible presence should not be precluded.

(9Ce51 continued)

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Lithics				
chert				
unmodified primary flakes			4	4
unmodified tertiary flakes			120	120
projectile point (Hamilton)			1	1
quartzite				
unmodified primary flakes			4	4
block debris			1	1
SUBTOTALS			130	130
Prehistoric Ceramics				
plain body sherd, sand-tempered			24	24
plain rim sherd, grog and sand-tempered			1	1
crumbs, sand-tempered			8	8
SUBTOTALS			33	33
TOTALS			163	163

9Ce93:

9Ce93 is a prehistoric lithic and ceramic site situated on a ridge crest. The site has been severely impacted by Box Springs Road, which probably cut through the middle of this site. Artifacts were limited to the eroded banks along the east side of the road. West of the road, the site extends out of the project area. This site partially overlaps with 9Ce137.

Although the site contains both lithic and ceramic artifacts, it is too badly disturbed to merit further testing.

(9Ce93 continued)

	General Surface Collection	2m x 2m Surface Collection Units	Shovel Pits	Total
Lithics				
chert				
unmodified primary flakes	1	1		2
unmodified secondary flakes	1			1
unmodified tertiary flakes	23	12	1	36
modified primary flakes	1			1
core	1			1
projectile point	1			1
bifacial fragment		1		1
quartzite				
unmodified primary flake	2	1		3
SUBTOTALS	30	15	1	46
Prehistoric Ceramics				
Deptford Checked Stamped, sand-tempered		1		1
eroded decoration, sand-tempered	1		1	2
plain body sherd, sand-tempered	7	1	2	10
SUBTOTALS	8	2	3	13
TOTALS	38	17	4	59

APPENDIX TWO

PROJECT PERSONNEL

VITAE

BIOGRAPHICAL INFORMATION

Name: Prentice M. Thomas, Jr.

Year of Birth: 1944

EDUCATIONAL BACKGROUND

B.A. with honors, 1966, University of South Carolina (Psychology)

Ph.D., 1972, Tulane University (Anthropology)

WORK EXPERIENCE

Undergraduate Research and Teaching Assistant, 1965-1966, Department of Anthropology, University of South Carolina

Teaching Assistant, 1967-1969, Department of Anthropology, University of South Carolina

Assistant Professor, 1970-1975, Department of Anthropology, University of Tennessee

Assistant Professor, 1975-1976, Departmento de Anthropologia, Universidad de las Americas, Puebla, Puebla, Mexio

President, New World Research, Inc., 1977-Present

GRANTS AND FELLOWSHIPS

Undergraduate

- Undergraduate Research Assistantship, University of South Carolina, 1965-1966

Graduate

- Graduate Teaching Assistantship, Tulane University, 1967-1968, 1969-1970
- NDEA Graduate Fellowship, 1968-1969
- Middle American Research Institute Travel and Research Grant, 1968
- Ford Foundation Trainee in Archaeology, Becan, Campeche, Mexico (administered through Tulane University), 1969

Professional

- National Geographic Society Research Grant, 1972, for Settlement Pattern Survey at Becan, Campeche, Mexico
- Educational Expeditions International Research Award, 1973, for Settlement Pattern Research at Becan, Campeche, Mexico--declined
- National Geographic Society Research Grant, 1973, for Settlement Pattern Survey at Becan, Campeche, Mexico
- Tennessee Historical Commission Grant for Archaeological Excavations at Fort Southwest Point, Tennessee, Summers, 1973, 1974, National Park Service Project, No. 47-74-00038
- Research Support Grant, Universidad de las Americas and Jenkins Foundation for Archaeological Research, at Rio Bec Campeche, Mexico, March-July 1976

PUBLICATIONS

1972 Review of "Indian Art of the American West," The Oak Ridger, February 11, 1972:1B, 11B.

1972 Ecological and Social Correlates of Religious Movements among North American Indians, Ph.D. dissertation, Tulane University, New Orleans, Louisiana

1973 Map of Two Historic Sites at the Nuclear Fast Breeder Reactor Plant, Kingston, Tennessee, ms. submitted to the Tennessee Valley Authority

1974 Review of Black Man of Zinacantan, by Sara Blaffer, and Change and Uncertainty in a Peasant Economy, by Frank Cancian, in Hispanic American Research Review, August, 1973, 53:3, 558-560

1974 "Prehistoric Settlement at Becan: a Preliminary Report," in National Geographic Society/Tulane University Program of Research in Campeche, E. Wyllys Andrews IV, Director: Preliminary Reports on Archaeological Investigations in the Rio Bec Area, Campeche, Mexico, Middle American Research Institute Publication 31, 139-146, New Orleans

1977 Archaeological Investigations at Fort Southwest Point, Kingston, Tennessee: a Federal Period Fortification, University of Tennessee, Knoxville, Tennessee

1977 Sampling Strategy in Archaeological Survey: Archaeological Reconnassiance in West Louisiana and East Texas, with L. Janice Campbell and Thomas D. Montagne. New World Research, Report of Investigations 1.

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1978 The Sabine National Wildlife Refuge: a cultural resources survey, with L. Janice Campbell and Thomas D. Montagne. New World Research, Report of Investigations 4.

1978 Prehistoric and historic settlement in the Cane River Basin, with L. Janice Campbell and B.E. Holmes. New World Research, Report of Investigations 8.

1978 Archaeological survey of a portion of the Calcasieu LNG project, with L. Janice Campbell. New World Research, Report of Investigations 9.

1978 Editor, The Houma-Terrebonne Archaeological Project, by Jeffrey H. Altschul. New World Research, Report of Investigations 10.

1978 A multicomponent site on the Happyville Bend of Little River: 16La37--The Whatley Site, with L. Janice Campbell. New World Research, Report of Investigations 11.

1979 The peripheries of Poverty Point, with L. Janice Campbell. New World Research, Report of Investigations 12.

1980 Archaeological testing at seven sites in the Fancy Hill area, Montgomery County, Arkansas, with L. Janice Campbell, Thomas D. Montagne, Mark T. Swanson, and Carol S. Weed. New World Research, Report of Investigations 19.

1980 A cultural resources survey of Houston pipe line company's 12-inch proposed pipeline, Padre Island, Texas, with Carol S. Weed. New World Research, Report of Investigations 30.

1980 Editor, Cultural resources investigations at Ono Island. New World Research, Report of Investigations 31.

1980 A cultural resources survey of the Kisatchie ranger district, Kisatchie National Forest Louisiana, with L. Janice Campbell, Mark T. Swanson, and John L. Lenzer. New World Research, Report of Investigations 34.

1980 Editor, Cultural resources investigations at the Redstone Arsenal, Madison County, Alabama. New World Research, Report of Investigations 35.

1980 Cultural resources survey of the proposed Trans-Continental Gas Pipe Line Corporation, 24-inch North Padre Island Pipeline, Texas, with Carol S. Weed. New World Research, Report of Investigations 38.

1980 The Hanna Site: an Alto Village in Red River Parish, with L. Janice Campbell and Steven R. Ahler. Louisiana Archeology, No. 5.

1981 Cultural resources survey of the proposed Coral Petroleum sprint field exploratory well number 1, with Carol S. Weed. New World Research, Report of Investigations 43.

1981 Prehistoric Maya settlement patterns at Becan, Campeche, Mexico. Middle American Research Institute, Publication 46.

1981 Editor, A cultural resources survey of the proposed TransAnadarko Pipeline System, Texas, Oklahoma, Arkansas, Louisiana. New World Research, Report of Investigations 37.

PAPERS PRESENTED

1973 Settlement Pattern Survey at Becan, Campeche, Mexico. Paper presented at the 38th Annual Meeting of the Society for American Archaeology, San Francisco, California

1973 Participant, Primera Mesa Redonda on Maya Art and Iconography, Palenque, Chiapas, Mexico

1974 Artificial Ridges at Becan, Campeche, Mexico. Paper presented at the 39th Annual Meeting of the Society for American Archaeology, Washington, D.C.

1974 Prehistoric Settlement Patterns at Becan, Campeche, Mexico: Second Preliminary Report. Paper presented at the XLI Congreso Internacional de Americanistas, Mexico, D.F.

1978 Chairman, Symposium on Excavations at the Hanna Site, an Alto Focus Village in Red River Parish, Louisiana. Presented at Caddo Conference, Nagcodoches, Texas.
1980 Testing Shallow Sites in Wooded Areas. Presented at Symposium on Site Locational Strategies in Vegetated Areas, Society for American Archaeology, Philadelphia, PA.
1980 The Peripheries of Poverty Point. Presented at Symposium Conference, New Orleans, Louisiana. n Archaeological

PREVIOUS RESEARCH IN CULTURAL RESOURCE MANAGEMENT: SERVED AS PRINCIPAL INVESTIGATOR ON THE FOLLOWING PROJECTS:

Thomas, Prentice Marguet, Jr., L. Janice Campbell, and Thomas D. Montagne
1977 Sampling Strategy in archaeological survey: archaeological reconnaissance in West Louisiana and East Texas: Texoma Group Strategic Petroleum Reserve Sites. Institute for Maya and New World Research Report of Investigations 1.

Thomas, Prentice Marquet, Jr., Newell O. Wright, Jr., L. Janice Campbell, and Steve Ahler
1977 Excavations at 16NA171, Cognac Revetment, Natchitoches Parish. Institute for Maya and New World Research Report of Investigations 2.

Thomas, Prentice Marquet, Jr., L. Janice Campbell, and Steven R. Ahler
1977 The Hanna site: an Alto focus village in Red River Parish, Louisiana. Institute of Maya and New World Research, Report of Investigations 3.

Thomas, Prentice M., Jr., L. Janice Campbell, and Thomas D. Montagne
1978 The Sabine National Wildlife Refuge: a cultural resources survey. New World Research, Report of Investigations 4.

Wright, Newell O., Jr.
1978 The Okefenokee National Wildlife Refuge: a cultural resources survey. New World Research, Report of Investigations 5.

1978 A cultural resource survey of the Cape Romain National Wildlife Refuge. New World Research Report of Investigations 6.

1978 A cultural resource survey of the Piedmont National Wildlife Refuge, Georgia. New World Research Report of Investigations 7.

Campbell, L. Janice, B.E. Holmes and Prentice M. Thomas, Jr.
1978 Prehistoric and historic settlement in the Cane River Basin. New World Research, Report of Investigations 8.

Thomas, Prentice M., Jr. and L. Janice Campbell
1978 Archaeological survey of a portion of the Calcasiev LNG project. New World Research, Report of Investigations 9.

Altschul, Jeffery H.
1978 The Houma-Terrebonne archaeological project. New World Research, Report of Investigations 10.

Thomas, Prentice M., Jr., and L. Janice Campbell
1978 A multicomponent site on the Happyville Bend of Little River: 16LA37. The Whatley site. New World Research, Report of Investigations 11.

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Swanson, Mark T., Jeffrey H. Altschul and L. Janice Campbell
1978 Archaeological survey of the Mississippi Sandhill Crane National Wildlife Refuge. New World Research, Report of Investigations 13.

Altschul, Jeffrey H.
1979 Archaeological survey of the proposed Terrebone Loop Pipeline, Southern Louisiana. New World Research, Report of Investigations 14.

Dickson, D. Bruce
1979 Cultural resources survey of ten project areas on Red River. New World Research, Report of Investigations 15.

Giardino, Marco J.
1979 Cultural resources survey and evaluation of the Cane Creek RC & D Measure, Lincoln County, Arkansas. New World Research, Report of Investigations 16.

Campbell, L. Janice
1979 Archaeological survey of a portion of the Calcasiev LNG project. New World Research, Report of Investigations 17.

Swanson, Mark T.
1979 Archaeological testing, Centenary College State Commemorative Area, Jackson, Louisiana. 2 volumes. New World Research, Report of Investigations 18.

Thomas, Prentice M., Jr., L. Janice Campbell, Thomas D. Montagne, Mark T. Swanson, and Carol S. Weed
1980 Archaeological testing at seven sites in the Fancy Hill area, Montgomery County, Arkansas. New World Research, Report of Investigations 19.

Dickson, Bruce D., Jr., and L. Janice Campbell
1979 Reelfoot and Lake Isom National Wildlife Refuge: a cultural resources survey. New World Research, Report of Investigations 20.

Swanson, Mark T.
1979 A Cultural Resources Survey of the Proposed Erath-Weeks Island Pipeline Route. New World Research Report of Investigations 21.

Swanson, Mark T.
1979 A cultural resources survey of three stream and river crossings of the proposed transcontinental gas pipe line project, Marion County, Mississippi. New World Research, Report of Investigations 22.

Swanson, Mark T.
1979 A cultural resources survey of the Clarence compressor station. New World Research, Report of Investigations 23.

Weed, Carol S., and Jeffery H. Altschul
1980 The central coal II project: a class II inventory of selected portions of Carbon, Emery and Sevier Counties, Utah. New World Research, Report of Investigations 25. (draft)

Weed, Carol S.
1979 Archaeological test excavation in a portion of lot 83 of the Port Bienville Industrial Park, Hancock County, Mississippi. New World Research, Report of Investigations 26.

Swanson, Mark T.
1979 A cultural resources survey of 30 acres in lot 84, Port Bienville Industrial Park, Hancock County, Mississippi. New World Research, Report of Investigations 27.

Swanson, Mark T.
1980 Archaeological testing at the Johnson site, 22HA540, Port Bienville Industrial Park: Hancock county, Mississippi. New World Research Report of Investigations 28.

1980 Phase I archaeological testing at Marston House, Clinton, Louisiana. New World Research, Report of Investigations 29.

Thomas, Prentice M., Jr., and Carol S. Weed
1980 A cultural resources survey of Houston pipe line company's 12-inch proposed pipeline Padre Island, Texas. New World Research, Report of Investigations 30.

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1980 Cultural resources investigations at Ono Island. New World Research, Report of Investigations 31.

Campbell, L. Janice, editor
1980 Archaeological investigations at Flat Bayou watershed, Jefferson County, Arkansas. New World Research, Report of Investigations 32. (draft)

Campbell, L. Janice, Carol S. Weed and Thomas D. Montagne
1980 Archaeological investigations at the Fort Gordon Military Reservation, Georgia. New World Research, Report of Investigations 33. (draft)

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1980 A cultural resources survey of the Kisatchie ranger district, Kisatchie National Forest Louisiana. New World Research, Report of Investigations 34.

Thomas, Prentice M., Jr.
1980 Cultural resources investigations at the Redstone Arsenal, Madison County, Alabama. New World Research, Report of Investigations 35. (draft)

New World Research, Inc.
1980 A cultural resources survey of a proposed Transcontinental Gas Pipe Line project in East Feliciana and East Baton Rouge Parishes, Louisiana. Report of Investigations 36.

1980 A cultural resources survey of a proposed International Paper Company effluent pipeline route in DeSoto and Red River Parishes, Louisiana. Report of Investigations 37.

1980 Cultural Resources survey of the proposed Trans-Continental Gas Pipe Line Corporation, 24-inch North Padre Island Pipeline, Texas. New World Research, Report of Investigations 38.

Thomas, Prentice M., Jr. and Carol S. Weed
1980 Cultural resources survey of the proposed Trans-Continental Gas Pipe Line Corporation, 24-inch North Padre Island Pipeline, Texas. New World Research, Report of Investigations 38.

New World Research, Inc.
1981 A cultural resources survey of pre-selected portions of the Upper Ouachita National Wildlife Refuge, Union and Morehouse Parishes, Louisiana. New World Research, Report of Investigations 39.

Swanson, Mark T. and Carol S. Weed
1980 A cultural resources survey of the proposed Transcontinental Gas Pipe Line Corporation, Padre Island 24-inch pipeline system from Laguna Madre to Falfurrias Oil Field. New World Research, Report of Investigations 40.

Thomas, Prentice M., Jr., and Carol S. Weed
1981 Cultural resources survey of the proposed Coral petroleum sprint field exploratory well number 1. New World Research, Report of Investigations 43.

Weed, Carol S., and Susan Fulgham
1981 Cultural resources survey of proposed well sites and access road state oil and gas lease no. 82053 Mustang Island, Neuces County, Texas. New World Research, Report of Investigations 44.

Shelly, Steven D.
1981 Cultural resources survey of the proposed McMoran exploration company S/D facility, McFaddan Marsh National Wildlife Refuge, Jefferson County, Texas. New World Research, Report of Investigations 45.

1981 Cultural resources survey of two proposed borrow pits, Redstone Arsenal, Madison County, Alabama. New World Research, Report of Investigations 46.

Swanson, Mark T.
1981 El Camino Real and the great migration route: an examination of 18th and early 19th century roads in Louisiana. New World Research, Report of Investigations 48.

New World Research, Inc.
1981 An analysis of the bone material from the surge basin of International Paper Company's Mansfield Mill. New World Research, Report of Investigations 49.

Fulgham, Susan
1980 A cultural resources survey of the proposed Clarence to Olla Pipeline, Natchitoches, Winn, and LaSalle Parishes, Louisiana. New World Research, Report of Investigations 50.

New World Research, Inc.
1982 Survey and Evaluation of J.N. "Ding" Darling National Wildlife Refuge, Florida

1980 Cultural Resources Survey of Fort Polk, Louisiana. In Preparation.

1981 Cultural Resources Survey, Fort Benning Military Reservation, Georgia. In preparation.

Co-Principal Investigator
Testing and Phase I Data Recovery at the Beaver Dam Group. RBR, Georgia. New World Research Report of Investigation 42.

VITAE

BIOGRAPHICAL INFORMATION

Name: L. Janice Campbell
Year of Birth: 1950

EDUCATIONAL BACKGROUND

B.A. with honors, 1972, University of Tennessee (Religious Studies)
M.A., 1975, University of Tennessee (Anthropology)

FORMAL TEACHING EXPERIENCE

Graduate Teaching Assistant, 1972-1974, Department of Anthropology, University of Tennessee
Instructor of Religion and Anthropology, 1974-1975, Carson Newman College, Jefferson City, Tennessee

FIELD WORK AND RESEARCH

Undergraduate

Analysis of Rehabilitation Program, Eastern State Psychiatric Hospital, Knoxville, Tennessee, Spring, 1971
Analysis of Rehabilitation Program--Focus on Addiction, Eastern State Psychiatric Hospital, Knoxville, Tennessee, 1971

Graduate

Community Survey of Friendsville, Tennessee, Spring 1972
Assistant Field Ethnographer, Friendsville Academy Study, Fall, 1972-Winter, 1974
Excavations at Fort Southwest Point, a post-Revolutionary War fort in Kingston, Tennessee, Summer 1973
Coding of Ceramic material recovered from the Maya site of Becan, Campeche, Mexico, December 1973
Laboratoty analysis of metal artifacts recovered from Fort Southwest Point, Spring 1974

Professional

Director, Study of Relationship between Religious Views and Sexual Attitudes, Focus on Eastern Tennessee, Winter and Spring 1975
Director, Anthropology/Language Study Program, in Merida, Yucatan, Mexico, May and June, 1975
Director, Housemound Excavation, Rio Bec Project, Campeche, Mexico, March to July, 1976
Research Associate, Survey of the Texoma Strategic Petroleum Reserve sites in Cameron and Calcasieu Parishes, Louisiana and Jefferson County, Texas, for Science Applications, Inc.,Spring 1977
Laboratory Director, Excavations at the Hanna Site, a prehistoric Caddoan village in northwest Louisiana, for the U.S. Army Corps of Engineers, New Orleans District, June to July and September to October 1977

Laboratory Director, testing project at the Cognac site, a prehistoric Caddoan village in northwest Louisiana, for the U.S. Army Corps of Engineers, New Orleans District, August, 1977

Cultural Resources Survey , Cape Romain National Wildlife Refuge South Carolina, for Interagency Archeological Services - Atlanta, December 1977

Archaeologist, intensive excavations at the Whatley site in a LaSalle Parish, Louisiana, for the Louisiana Department of Transportation and Development of Transportation and Development, 1978

Archaeologist, portion of the cultural resources survey in the peripheries of Poverty Point, Epps, Louisiana, for EMANCO Inc., 1978

Laboratory director, excavations at localities in the peripheries of Poverty Point, Epps, Louisiana, for EMANCO Inc., 1978

Director, site probability study in the Cane River Basin, northwestern Louisiana, for the U.S. Army Corps of Engineers New Orleans, District, 1978

Principal Investigator, cultural resources survey of the Mississippi Sandhill Crane National Wildlife Refuge, Ocean Springs, Mississippi, for Interagency Archeological Services - Atlanta, 1978

Principal Investigator, survey and testing program at Centenary College State Commemorative Area, Jackson, Louisiana, for the Louisiana Office of State Parks, 1979

Principal Investigator, intensive testing at Centenary College State Commemorative Area, for the Office of State Parks, 1970

Project Director, Sampling survey at Fort Gordon, Georgia, for Interagency Archeological Services - Atlanta, 1980

Principal Investigator, Sampling survey at Kisatchie National Forest, Louisiana, for the National Park Service, 1980

Principal Investigator, Survey and testing at Flat Bayou Watershed, Arkansas, for Interagency Archeological - Atlanta 1980

Principal Investigator, Testing at three sites in the Port Bienville Industrial Park, Mississippi, for the Hancock County Port and Harbor Commission, 1979

Principal Investigator, Survey of Lot 83, in the Port Bienville Industrial Park, Mississippi, for Borg Warner Chemical Corporation, 1980

Research Archaeologist, Survey and testing at Redstone Arsenal, Alabama, for Water and Air Research, Inc., 1980

Research Archaeologist, Survey and testing at Ono Island, Alabama, for the Ono Island Development Corporation and Ono Island East, Inc.. 1980

Principal Investigator, Cultural Resources Survey of Upper Ouachita National Wildlife Refuge, Louisiana; for Interagency Archaeological Services-Atlanta.

Co-Principal Investigator, Testing and Phase I data recovery at the Beaverdam Group, RBR project, Georgia; for Interagency Archaeological Services-Atlanta.

Co-Principal Investigator, Sample survey of Fort Polk, Louisiana; for Interagency Archaeological Services-Atlanta.

Co-Principal Investigator, Transandarko Pipeline Survey, Texas, Oklahoma, Arkansas and Louisiana; for EMANCO, Inc.

Research Archaeologist, Jupiter Inlet Coast Guard Station, Cultural Resources Survey and Architectural Evaluation, Florida; for Interagency Archeological Services - Atlanta.

Research Archaeologist, Cultural Resources Survey of the J.N. "Ding" Darling National Wildlife Refuge, Sanibel Island, Florida; for IAS.

Research Archaeologist, Data Recovery Program at Two Sites Within the Pelican Island National Wildlife Refuge, Indian River County, Florida; for IAS-A.

Research Archaeologist, Phase I Cultural Resources Survey and Architectural Evaluation, Eglin Air Force Base, Florida; for IAS-A.

Co-Principal Investigator, Cultural Resources Survey of the Fort Benning Military Reservation; for IAS-A.

PUBLICATIONS

1975 A Therapeutic Approach to Education: an Ethnographic Analysis of Friendsville Academy, a Quaker Middle and Secondary School. M.A. thesis, University of Tennessee, Knoxville, Tennessee

1975 "Reorientation of a Religious Academy," in Faculty Studies, Spring Edition, Rogersville, Tennessee

1975 Review of "Original Gourd Craftsmanship," in The Oak Ridger, June

1975 "History of Fort Southwest Point," in Archaeological Excavations at Fort Southwest Point, Kingston, Tennessee, in press

1976 "Excavations at Rio Bec Temple B," with Prentice Thomas, in Revista Mesoamerica, in press

1977a "History of Fort Southwest Point," in Archaeological Investigations at Fort Southwest Point, Kingston, Tennessee, by Prentice M. Thomas, Jr., University of Tennessee, Knoxville

1977b "Resistivity Survey," in Archaeological Investigations at Fort Southwest Point, Kingston, Tennessee, by Prentice M. Thomas, Jr., University of Tennessee, Knoxville

1977 Sampling Strategy in Archaeological Survey: Archaeological Reconnaissance in West Louisiana and East Texas, with Prentice M. Thomas, Jr., and Thomas D. Montagne. Manuscript submitted to the Environmental Protection Agency

1977 Excavations at 16Na171, Cognac Revetment, Natchitoches Parish, with Prentice M. Thomas, Jr., Newell O. Wright, Jr., and Steve Ahler. Manuscript submitted to the U.S. Army Corps of Engineers, New Orleans District

1977 The Hanna Site: an Alto Village in Red River Parish, with Prentice M. Thomas, Jr., and Steve Ahler. Manuscript submitted to the U.S. Army Corps of Engineers, New Orleans District

1978 Cultural Resources Survey of Sabine National Wildlife Refuge, with Prentice M. Thomas, Jr., and Thomas D. Montagne. Manuscript submitted to Interagency Archeological Services - Atlanta

1978 Prehistoric and Historic Settlement in the Cane River Basin, with Barbara E. Holmes and Prentice M. Thomas, Jr. Manuscript submitted to the U.S. Army Corps of Engineers, New Orleans District

1978 Archaeological Survey of a Portion of the Calcasieu LNG Project, with Prentice M. Thomas, Jr. Manuscript submitted to EMANCO, Inc.

1978 Editor, The Houma-Terrebonne Archaeological Project, by Jeffrey H. Altschul. Manuscript submitted to Sverdrup and Parcel and Associates, St. Louis, Missouri

1978 A Multicomponent Site on the Happyville Bend of Little River: 16La37 -- the Whatley Site, with Prentice M. Thomas, Jr. Manuscript submitted to the Louisiana Department of Transportation and Development, Baton Rouge

1979 The Peripheries of Poverty Point, with Prentice M. Thomas, Jr. Manuscript submitted to EMANCO, Inc.

1979 Archaeological Survey of the Mississippi Sandhill Crane National Wildlife Refuge, with Mark T. Swanson and Jeffrey H. Altschul. Manuscript submitted to Interagency Archeological Services - Atlanta

1979 Editor, Archaeological Testing of Centenary College State Commemorative Area, Jackson, Louisiana, by Mark T. Swanson. Manuscript submitted to the Louisiana Office of State Parks

1979 Cultural Resources Survey of a Portion of the Calcasieu LNG Project. Manuscript submitted to EMANCO, Inc.

1980 Editor, Archaeological Investigations at Flat Bayou Watershed, Jefferson County, Arkansas. Manuscript submitted to Interagency Archeological Services - Atlanta

1980 Reelfoot and Lake Isom National Wildlife Refuges: a Cultural Resources Survey. Manuscript submitted to Interagency Archeological Services - Atlanta

1980 Archaeological investigations at the Fort Gordon Military Reservation, Georgia; with Carol S. Weed and Prentice M. Thomas. Manuscript submitted to Interagency Archeological Services - Atlanta.

1980 A cultural resources survey of the Kisatchie Ranger District, Kisatchie National Forest, Louisiana; with Mark T. Swanson, John L. Lenzer and Prentice M. Thomas, Jr. Report submitted to United States Forest Service.

1981 Editor, Cultural Resources Survey of the Proposed TransAnadarko Pipeline System, Texas, Oklahoma, Arkansas, Louisiana. Manuscript submitted to EMANCO Inc. - Houston.

1981 Editor, Cultural Resources Survey of Pre-selected Portions of the Upper Ouachita National Wildlife Refuge, Union and Morehouse Parishes, Louisiana. Manuscript submitted to Interagency Archeological Services - Atlanta.

1980 Cultural resources survey of the city of Natchitoches proposed sewage facilities, Natchitoches, Louisiana. Manuscript submitted to City of Natchitoches.

1981 Archaeological Investigations at 9EB92, 9EB207, 9EB208, and 9EB209 (The Beaverdam Group), Richard B. Russell Multiple Use Area, Elbert County, Georgia; with Carol S. Weed (Editors). Manuscript submitted to Interagency Archeological Services - Atlanta.

1981 Editor, Cultural Resources Survey of the Proposed McMoRan Exploration Company S/D facility, McFadden Marsh National Wildlife Refuge, Jefferson County, Texas. Manuscript submitted to EMANCO Inc.

1981 Editor, Cultural Resources Survey of Two Proposed Borrow Pits, Redstone Arsenal, Madison County, Alabama. Manuscript submitted to U.S. Army, Corp of Engineers, Mobile District.

1981 Editor, Results of a Literature and Background Search of the Proposed Low BTU Pipeline, East Central Texas. Manuscript submitted to EMANCO Inc.

1981 Literature Review and Cultural Resources Survey of the U.S. Coast Guard Light Station, Jupiter Inlet, Palm Beach County, Florida, with L. Janice Campbell and Prentice M. Thomas, Jr. Manuscript submitted to Interagency Archeological Services - Atlanta.

1981 Research Archaeologist, The Caron Site (1BA376): Archaeological Excavation of a Late Weeden Island/Fort Walton Site in Baldwin County, Alabama. Manuscript submitted to Interagency Archeological Services - Atlanta.

1982 Research Archaeologist, Cultural Resources Survey of a Portion of the J.N. 'Ding' Darling National Wildlife Refuge Sanibel Island, Lee County, Florida; with Prentice M. Thomas, Carol S. Weed. Manuscript submitted to Interagency Archeological Services - Atlanta.

1982 Research Archaeologist, Archaeological Investigations at the Turtle Pond Site (22It643), Itawamba County, Mississippi; with Prentice M. Thomas, Carol S. Weed, Kathy Bagley-Baumgartner and Mark T. Swanson. Manuscript submitted to U.S. Army, Corp of Engineers, Mobile District.

PAPERS PRESENTED

1981 Late Archaic Occupations in the Sand Hills Region of Georgia: Application of the Focal-Diffuse Model, with Carol S. Weed and Prentice M. Thomas, Jr., paper presented at the Southeastern Archaeological Conference, Ashville, North Carolina.

VITAE

BIOGRAPHICAL INFORMATION

Name: Mark T. Swanson
Year of Birth: 1951

EDUCATIONAL BACKGROUND

B.A., 1974, University of North Carolina, Chapel Hill (Anthropology and History)
M.A., 1981, Universidad de las Americas, Cholula, Puebla, Mexico (Anthropology)

FORMAL TEACHING EXPERIENCE

Instructor, Universidad de las Americas, Cholula, Puebla, Mexico, Department of Anthropology, 1977-1978

FIELD WORK AND RESEARCH

Undergraduate

- Excavator, Tell Gezer, Israel, under Dr. William Dever, Hebrew Union College, Summer, 1970

Graduate

- Field Supervisor, El Pozito, Belize, under Mary Nievens, Universidad de las Americas, Spring, 1976
- Excavator, Becan, Yucatan Peninsula, Mexico, under Dr. Prentice M. Thomas, Jr., Universidad de las Americas, 1976

Professional

- Crew Member, Test and Evaluation of Localities in the Peripheries of Poverty Point, Northeastern Louisiana, Summer, 1978; for New World Research, Inc.
- Staff Archaeologist, Cultural Resources Survey of Ten Items on the Red River, Northwest Louisiana, Summer, 1978; for New World Research, Inc.
- Survey Supervisor, Cultural Resources Survey of the Mississippi Sandhill Crane National Wildlife Refuge, Ocean Springs, Mississippi, September, 1978; for New World Research, Inc.
- Field Supervisor, Survey and Testing Program at Centenary College State Commemorative Area, Jackson, Louisiana; for New World Research, Inc.
- Archaeologist, Test and Excavations at Fancy Hill Barite Project, Arkansas; for New World Research, Inc.
- Survey Supervisor, Archaeological Survey of 30 acre lot in Port Birnville Industrial Park, Hancock County, Mississippi, Fall, 1979.
- Field Supervisor, Archaeological Excavations at Marston House, Clinton, Louisiana, January 1980.
- Field Supervisor, Archaeological Testing at the Johnson Site, 22HA540, Port Bienville Industrial Park, Hancock County, Mississippi, January, 1980.
- Archival Researcher, Cultural Resources Investigations at Ono Island, Spring, 1980.

Survey Archaeologist, Cultural Resources Survey of Three Stream and River Crossings of the Proposed Transcontinental Gas Pipeline Project, Marion County, Mississippi, November, 1979.

Survey Supervisor, Archaeological Survey of Kisatchie Ranger District, Kisatchie National Forest, Natchitoches Parish, Louisiana, December, 1979 and Spring, 1980.

Archaeologist, Archaeological Survey of 40 mile pipeline from Clarence to Olla, Louisiana, July, 1980.

Survey Supervisor, Cultural Resources Survey of Proposed Gas Pipeline Project in E. Feliciana and E. Baton Rouge Parishes, Louisiana, August, 1980.

Survey Supervisor, Cultural Resources Survey of Proposed Transcontinental Gas Pipeline Corporation Padre Island 24 inch pipeline system from Laguna Madre to Falfurrias Oil Field, November, 1980.

Lithic Analyst, The Beaverdam Group Sites, 9Eb92, 207, 208, 219, The Richard B. Russel Reservoir Project, Georgia, Fall, 1980.

Survey Supervisor, The Beaverdam Group Sites, 9Eb92, 207, 208, 219, The Richard B. Russel Reservoir Project, Georgia, August, 1980.

Archivist, El Camino Real project for Kisatchie-Delta Regional Planning District, January-February, 1981.

Site Recorder, Cultural Resources Survey and Evaluation of Fort Polk Military Reservation, Louisiana. Conducted for IAS-A, February-May, 1981.

Archivist, Historic Site evaluator and Historic Artifact Analyst, Cultural Resources Survey and evaluation of Fort Polk Military Reservation, Louisiana. Conducted for IAS-A, February - May, 1981.

Project Director, Excavations at the BugHill site, a multiponent mound site in Clayton, Oklahoma. For the Tulsa Oklahoma District Corps of Engineer, Sept-Nov 1981.

Project Director, Cultural Resources Survey and evaluation of Fort Benning Military Reservation, Georgia. Conducted for IAS-A Dec, 1981.

Survey Archaeologist, Cultural Resources Survey of the Big Thicket National Preserve, Texas. Conducted for EMANCO Inc. January, 1982.

Survey archaeologist and Artifact Analyst, Cultural Resources Survey of proposed Transcontinental Gas Pipe Line Corporation Main Line Expansion, Calcasieu, Beauregard, and St. Landry Parishes, Louisiana. Conducted for EMAMCO Inc., February - March, 1982.

Lithic Analyst, Cultural Resources Investigations of the Turtle Pond Site, 22It643. Conducted for U.S. Army Corps of Engineers, Mobile Office.

Site Recorder and Historical Researcher, Cultural Resources Investigations at the Fort Polk Military Reservation, Vernon, Sabine, and Natchitoches Parishes, Louisiana. Conducted for National Park Service, Southwest Region.

Field Director, CUltural Resources Survey and Limited Testing Program of the Proposed Raccourci Island Lateral Pipeline, West Feliciana and Point Coupee Parishes, Louisiana. Conducted for EMANCO Inc., Houston, Texas.

Field Director and Archivist, Cultural Resources Survey of a 2,200 Acre Tract at the Fort Benning Military Reservation, Chattahoochee County, Georgia. Conducted for Department of the Army, through Archaeological Services Branch, Division of National Register Programs, National Park Service, Southeast Region, December 1981.

Field Director and Archivist for Terrestrial Survey, Cultural Resources Survey of Terrestrial and Off-Shore Location, Lake Pontchartrain and Vicinity Hurricane Protection Project, Louisiana. Conducted for U.S. Army Corps of Engineers, New Orleans, August - September 1982.

Field Director, Phase II Cultural REsources Survey of a Proposed Softball/Soccer Field at Redstone Arsenal, Madison County, Alabama. Conducted for Redstone Arsenal, Fall 1982.

Prehistoric and Historic Site Recorder, Phase I Cultural Resources Survey at Eglin Air Force Base, Florida, Summer 1982.

Archivist, Phase I Cultural Resources Survey at Eglin Air Force Base, Florida, Fall 1982.

Archivist, Background and Literature Review of Three Porposed Alternatives, Bossier, Caddo, DeSoto, and Webster Parishes, Louisiana; Harrison and Marion Counties, Texas; Lafayette County, Arkansas. Conducted for U.S. Army Corps of Engineers, Vicksburg, Spring 1983.

Prehistoric and Historic Site Recorder, Phase II Cultural Resources Survey at Eglin Air Force Base, Florida, Spring and Summer 1983.

Archivist, A history of the Plaquemine Lock (in progress). Conducted for Louisiana Office of State Parks, Department of Culture, Recreation, and Tourism.

PUBLICATIONS

1975 Article on Beach Erosion, *North Carolina Wildlife Magazine*, Spring Issue

1979 "Poverty Point Objects," in *The Peripheries of Poverty Point*, by Prentice M. Thomas, Jr., and L. Janice Campbell; ms. submitted to EMANCO, Inc.

1979 "Stone Vessel Fragments," in *The Peripheries of Poverty Point*, by Prentice M. Thomas, Jr., and L. Janice Campbell; ms. submitted to EMANCO, Inc.

1979 "Stone Vessel Fragments," in The Peripheries of Poverty Point, by Prentice M. Thomas, Jr., and L. Janice Campbell; ms. submitted to EMANCO, Inc.

1979 Archaeological Survey of the Mississippi Sandhill Crane National Wildlife Refuge, with Jeffrey A. Altschul and L. Janice Campbell; ms. submitted to Interagency Archeological Services - Atlanta

1979 "Lithics", in Cultural Resources Survey and Evaluation of the Cave Creek RC & D Measure, Lincoln County, Arkansas, by Marco J. Giardino, New World Research, Report of Investigations No. 16.

1979 Archaeological Testing, Centenary College State Commemorative Area, Jackson, Louisiana (volume 1), New World Research, Report of Investigations, No. 18.

1979 "La litica del area de Huejotzingo", Projecto Puebla-Tlaxcala, Comunicaciones 17:35-46, Puebla, Mexico.

1980 "Artifact Analysis" in Archaeological Testing at Seven Sites in the Fancy Hill Area, Montgomery County, Arkansas, prepared by New World Research, Inc., for EMANCO, Inc. New World Research, Report of Investigations, No. 19.

1980 "Historic Site Descriptions and Artifact Analysis", in Archaeological Testing at Seven Sites in the Fancy Hill Area, Montgomery County, Arkansas, prepared by New World Research, Inc., for EMANCO, Inc. New World Research, Report of Investigations, No. 19.

1980 Archaeological Testing, Centenary College State Commemorative Area, Jackson, Louisiana, volume II, New World Research, Report of Investigations, No. 18, volume 2.

1980 Archaeological Testing at the Johnson Site, 22HA540, Port Bienville Industrial Park, Hancock County, Mississippi. New World Research, Report of Investigations, No. 28.

1980 "A Selected History of the Gulf Coast Between Mobile and Pensacola", in Cultural Resources Investigations at Ono Island. New World Research, Report of Investigations, No. 31.

1980 "History of Ono Island" in Cultural Resources Investigations at Ono Island. New World Research, Report of Investigations, No. 31.

1980 Phase I Archaeological Testing at Marston House, Clinton, Louisiana. New World Research, Report of Investigations, No. 29.

1980 A Cultural Resources Survey of the Proposed Transcontinental Gas Pipe Line Corporation Padre Island 24-inch Pipeline System from Laguna Madre to Falfurrias Oil Field. Prepared for EMANCO, Inc. by New World Research, Inc., Report of Investigations, No. 40. (co-authored with Carol S. Weed).

1981 Camino Real and the Great Migration Route: an examination of 18th century roads in Louisiana. New World Research Report of Investigations, No. 48.

1981 Cultural Resources Survey of Two Proposed Seismic Test Lines n the Lance Rosier Unit of the Big Thicket National Preserve, Hardin County, Texas. New World Research, Report of Investigations 62.

1982 Cultural Resources Survey of Proposed Seismic Test Lines in the Lance Rosier Unit of the Big Thicket National Preserve, Hardin County, Texas. New World Research, Report of Investigations 63. [with Robert S. Webb]

1982 A Cultural Resources Survey of the Proposed Transcontinental Gas Pipe Line Corporation Main Line Expansion, Calcasieu, Beuregard, and St. Landry Parishes, Louisiana. New World Research, Report of Investigations 64.

1982 "Lithics" in Archaeological Investigations at Turtle Pond Site (22It 643), Itawamba County, Mississippi, New World Research, Report of Investigations 64.

1982 "Historic Artifact Analysis" in Cultural Resources Investigations at the Fort Polk Military Reservation, Vernon, Sabine, and Natchitoches, Parishes, Louisiana. New World Research, Report of Investigations 69.

1982 "Historical Development of the Fort Polk Area" in Cultural Resources Investigations at the Fort Polk Military Reservation, Vernon, Sabine, and Natchitoches, Parishes, Louisiana. New World Research, Report of Investigations 69.

1982 A Cultural Resources Survey and Limited Testing Program of the Proposed Raccourci Island Lateral Pipeline, West Feliciana and Point Coupee Parishes, Louisiana. New World Research, Report of Investigations 70.

1982 "History: An Examination of Regional Implications and Settlement Remains" in An Intensive Survey of a 2,200 Acre Tract within a Proposed Maneuver Area at the Fort Benning Military Reservation, Chattahoochee County, Georgia. New World Research, Report of Investigations 71.

1982 Cultural Resources Survey of Four Proposed Seismic Test Lines in the Lance Rosier Unit of the Big Thicket National Preserve, Hardin County, Texas. New World Research, Report of Investigations 72. (with David A. Phillips)

1982 A Phase II Cultural Resources Survey of a Proposed Softball/Soccer Field at Redstone Arsenal, Madison County, Alabama. New World Research, Report of Investigations 81. (with Carol S. Weed)

1982 "Kolonialstrassen und Besiedlung in Mittel-Louisiana." Ethnologia Americana 4(102):1040-1042. Dusseldorter Institut fur amerikanische Volkerkunde.

1983 Background and Literature Review of Three Proposed Alternatives, Bossier, Caddo, DeSoto, and Webster Parishes, Louisiana; Harrison and Marion Counties, Texas; Lafayette County, Arkansas. New World Research, Report of Investigations 93. (with L. Janice Campbell, Carol S. Weed, and John E. Keller)

1983 A History of the Plaquemine Lock (in progress). New World Research, Report of Investigations

VITAE

BIOGRAPHICAL INFORMATION

Name: Jeffrey H. Altschul
Year of Birth: 1953

EDUCATIONAL BACKGROUND

B.A., 1975, Reed College (Anthropology)
Ph.D., 1981, Brandeis University (Anthropology)

PROFESSIONAL ORGANIZATIONS

Society for American Archaeology
American Anthropological Association
National Trust for Historic Preservation

WORK EXPERIENCE

Teaching Assistant, 1976-1977, Department of Anthropology, Brandeis University

Research Assistant, 1976-1981, Teotihuacan Mapping Project.

Staff Archaeologist, 1977-1978, Staff Archaeologist, New World Research, Inc.

Archaeological Consultant, 1979-1981, New World Research, Inc.

Instructor in Archaeology/Anthropology, 1980-1981, Department of Anthropology, Massachusetts Institute of Technology.

Associate Archaeologist, 1981-present, New World Research, Inc.

GRANTS AND FELLOWSHIPS

Undergraduate

- National Science Foundation Undergraduate Participant Program, Vernon, Arizona, 1973

Graduate

- Brandeis University Graduate Stipend, 1975-1978
- Brandeis University research grant to work on Jolly Beach project, 1976-1977
- Brandeis University research grant to work at Teotihuacan, Mexico, 1978
- National Science Foundation Doctoral Dissertation Research Support Grant, BNS-7920938
- Brandeis University Graduate Fellowship, 1981

RESEARCH PROJECTS

Undergraduate

Crew member, archaeological excavations at an 17th century Indian kill site, Chicago, Illinois, June to August 1969.

Crew member, excavation at a 20 room pueblo site near Snowflake Arizona, also conducted a re-analysis of material from the Lowry ruin in southwestern Colorado, June to August 1973.

Graduate

Research Assistant, classified the lithic and faunal material from the Jolly Beach site, Antigua, September 1976 to September 1977.

Research Assistant, Teotihuacan Mapping Project, spatial and statistical analyses of computerized data from Teotihuacan, Mexico, September 1976 to September 1977.

Archaeological Assistant, numerous survey projects in Massachusetts, June 1976 to August 1977.

Laboratory analyst, historic, lithic, and ceramic artifacts from the Hanna site in Red River Parish, Louisiana, September to October 1977.

Field Supervisor, Houma-Terrebonne project, consisted of relocation and test excavation at thirty-three sites, February to March 1978.

Field Supervisor, Poverty Point project, survey and limited test excavation at eleven sites near Poverty Point in northeast, Louisiana, May to June 1978.

Field Supervisor, Teotihuacan Mapping Project's excavation of the cave underneath the Pyramid of the Sun at Teotihuacan, Mexico, July to August 1978.

Co-Field Director, Cane River Watershed Test and Evaluation Project, Lincoln County, Arkansas. Limited test excavation of eight Archaic and Woodland period sites, November 1978.

Research Assistant, Teotihuacan Mapping Project, Computer and statistical manipulation of data collected by the project, March 1980 to June 1981.

Professional

Principal Investigator, site survey and surface collections at Teotihuacan, Mexico. June 1981 - August 1981.

Principal Investigator, the Bug Hill Site (34Pu116) Excavations and Analysis of a multi-component midden mound in the Ouachita Mountains, southeast Oklahoma. September 1981 - July 1983.

Quantitative Archaeologist, Fort Benning Survey, statistical and spatial analysis of 22,000 acres leading to a quantitative predictive model of settlement location. December 1981 - April 1983.

Principal Investigator, Clear Creek Bay Site 16Gr20, Excavation and analysis of Marksville-Coles Creek ceremonial center on Little River, Louisiana, May 1982 - August 1982.

Principal Investigator, the Brewer Bend Site (34Ms130), Excavation and analysis of a multi-component midden along the Arkansas River, east Oklahoma. March 1983 - June 1983.

Quantitative Archaeologist, Eglin Air Force Base sample survey, spatial and statistical analyses of settlement location within a 1,000 square mile region of the Florida Panhandle, April 1982 -

Principal Investigator, The Mudhole site (3Ct50), Excavation and analysis of a Late Woodland-Early Mississippian site in Middle Mississippi Valley, northeast Arkansas, September 1982 -

PUBLICATIONS

Articles

1978 The Development of the Chacoan Interaction Sphere. Journal of Anthropological Research 44:109-146.

1980 Historical component. In The Hanna site: an Alto Village in Red River Parish, Louisiana, by Prentice M. Thomas, L. Janice Campbell, and Steven R. Ahler. Louisiana Archaeology 5:301-317.

1981 Spatial and statistical evidence of social grouping at Teotihuacan, Mexico. Ph.D. dissertation, Brandeis University University Microfilms: Ann Arbor.

in press Spatial analysis of Teotihuacan: A Mesoamerican metropolis (with George L. Cowgill and Rebecca S. Sload). In Intrasite Spatial Analysis in Archaeology, edited by Harold Hietala and Paul Larson, Cambridge University Press, Cambridge.

in press Social districts of Teotihuacan. In Teotihuacan: New data, new interpretations, new synthesis, edited by Evelyn C. Rattray. UNAM Press: Mexico City.

Contractual Reports

1978 Cultural resources impact assessment: Houma-Terrebonne Sewerage Plan. New World Research, Report of Investigations 10.

1979 Archaeological survey of the proposed Terrebonne Loop Pipeline, Southern Louisiana. New World Research, Report of Investigations 14.

1979 Review of archaeological investigations. In Peripheries of Poverty Point, by Prentice M. Thomas and L. Janice Campbell. New World Research, Report of Investigations 12.

1979 Ceramics. In Peripheries of Poverty Point, by Prentice M. Thomas and L. Janice Campbell. New World Research, Report of Investigations 12.

1979 History of archaeological investigations. In Cultural resources survey of the Cane River RC & D measure, Lincoln County, Arkansas, edited by Marco Giardino. New World Research, Report of Investigations 16.

1979 Culture history (with Marco Giardino). In Cultural resources survey of the Cane River RC & D measure, Lincoln County, Arkansas, edited by Marco Giardono. New World Research, Report of Investigations 16.

1980 Review of archaeological research in the Mobile Bay region. In Cultural Resources Survey at Ono Island, Baldwin County, Alabama, edited by Prentice M. Thomas and L. Janice Campbell. New World Research, Report of Investigations 31.

1980 Current issues in the prehistory of Mobile Bay region. In Archaeological survey and excavations on Ono Island, Baldwin County, Alabama edited by Prentice M. Thomas and L. Janice Campbell. New World Research, Report of Investigations 31.

1981 The Central Coal II Project: a class II inventory of selected portions of Carbon, Emery, and Sevier Counties, Utah (with Prentice M. Thomas, L. Janice Campbell, and Carol S. Weed). New World Research, Report of Investigations 25.

1981 Environment. In Archaeological Investigations at the Fort Gordon Military Reservation, Georgia, by L. Janice Campbell, Carol S. Weed, and Prentice M. Thomas. New World Research, Report of Investigations 33.

1981 Issues in historic and prehistoric research along the Savannah River. In Archaeological Investigations at the Fort Gordon Military Reservation, Georgia, edited by L. Janice Campbell, Carol S. Weed, and Prentice M. Thomas. New World Research, Report of Investigations 33.

1981 Ethnohistory of the middle Tennessee River. In Cultural Resources Investigations at the Redstone Arsenal, Madison County, Alabama, edited by Prentice M. Thomas New World Research, Report ofInvestigations 34.

1981 History of Madison County, Huntsville, and the Redstone Arsenal. In Cultural Resources Investigations at the Redstone Arsenal, Madison County, Alabama, edited by Prentice M. Thomas. New World Research, Report of Investigations 34.

1981 Archaeological Test and Evaluation of the Flat Bayou Watershed (with L. Janice Campbell and Mark T. Swanson). New World Research, Report of Investigations 32.

1982 An Intensive Survey of a 2,200 Ac Tract within a proposed Maneauver Area at the Fort Benning Military Reservation, Chattahoochee County, Georgia (with Prentice M. Thomas, Jr., L. Janice Campbell, Mark T. Swanson, and Carol S. Weed). New World Research, Report of Investigations 71.

1983 Clear Creek Bay Site (16Gr20): Investigation of a Marksville/Coles Creek Site in Grant Parish, Louisiana (with John E. Keller and L. Janice Campbell). New World Research, Report of Investigations 83.

In Press Bug Hill: Excavation of a multi-component midden mound in the Jackfork Valley, Pushmataha County, Oklahoma. New World Research, Report of Investigations 76.

PAPERS

1982 A Progress Report on the Bug Hill Site, Pushmataha County, Oklahoma. Paper presented at the Fourth Annual Flint Hills Archaeological Conference. Tulsa.

1982 Bug Hill: Excavation of a multi-component midden mound, Clayton (Sardis) Lake, Southeast Oklahoma. Paper presented at the annual meetings for the Society for American Archaeology, Minneapolis.

1983 Studying Change in a Conservative Culture. Paper presented at the Twenty-fifth annual Caddo Conference, Natchitoches, Louisiana.

VITAE

BIOGRAPHICAL INFORMATION
- Name: Carol S. Weed
- Year of Birth: 1949

EDUCATIONAL BACKGROUND
- B.A. with honors, 1970, Prescott College (Anthropology)
- M.A., 1975, University of Arizona (Anthropology)

FORMAL TEACHING EXPERIENCE
- Instructor in Anthropology, Prescott College, 1973-1974
- Instructor in Anthropology, Texas A&M University, Spring 1973 to Spring 1979

FIELD WORK AND RESEARCH
- Undergraduate
  - Student Assistant, Otero Junior College, Colorado Historical Commission, Ft. Vasquez/Ft. St. Vrain Project, 1967
  - Laboratory Director, Center for Anthropological Studies, Prescott College, 1967-1970
  - Student Assistant, Black Mesa Archaeological Project, 1968
  - Assistant Field Director (survey operations), Black Mesa Archaeological Project, 1969-1970
- Graduate
  - Research Assistant, Highway Salvage Program, Arizona State Museum, 1970-1973
  - Member, Tabun Project, Israel, 1971
  - Assistant Field Director, Parr Archaeological Project, South Carolina, 1972
  - Assistant Field Director, Black Mesa Archaeological Project, Anasazi Sites, 1973
- Professional
  - Field Director, Central Arizona Ecotone Project, Hohokam and Sinagua Sites, 1973-1975
  - Laboratory Director, Black Mesa Archaeological Survey, 1976
  - Field Director, TAMU Choke Canyon/Nueces River Project Surface Collection-Preliminary Testing, Early to Late Archaic Sites, 1977
  - Field Director, Rockdale-Shell Oil Project Excavation of Middle Archaic Lithic Site 41MM116, 1978
  - Field Director, Central Coal II, Survey Carbon, Emery, Sevier Counties, Utah 1979-80; for BLM
  - Senior Archaeologist, Redstone Arsenal Project, Testing of 26 sites and survey, 1980; for Corps of Engineers, Mobile District
  - Senior Archaeologist, excavations at 9Eb92, 9Eb207, 9Eb208, 9Eb219, Richard B. Russell Multiple Resource Area, Georgia and South Carolina, 1980; for IAS-A

Senior Archaeologist, Houston Pipe Line Company's 12-inch pipeline, Padre Island, Texas, survey; for EMANCO Inc., Houston, Texas

Principal Investigator, Cultural Resources Survey of the Jupiter Inlet Coast Guard Station, Palm Beach County, Florida 1981; for IAS-A.

Senior Archaeologist, proposed seismic lines, Big Thicket National Preserve, Texas, survey; for EMANCO Inc., Houston, Texas.

PUBLICATIONS

1970 Two twelfth-century burials from the Hopi reservation. Plateau 43:1.

1971 The Henderson site: preliminary report. With A.E. Ward, Kiva, 36:2.

1972 Survey and excavation on Black Mesa, 1969-1970. With G.J. Gumerman, Deborah Westfall. Prescott College Studies in Anthropology 4.

1973 The Beardsley Canal site: a colonial Hohokam riverine extension site, Kiva 38:1.

1975 The Hydrology of Prehistoric Farming Systems in a Central Arizona Ecotone, Final Report for the Period Ending September 30, 1975 (NAS 9-14610), prepared for Lyndon B. Johnson Space Center, Houston, Texas; on file, Southern Illinois University Department of Anthropology, Carbondale, Illinois.

1976 Adaptive Strategies in a Biological and Cultural Transition Zone: the Central Arizona Ecotone Project; an Interim Report, with George J. Gumerman and John A. Hanson, University Museum Studies 6, Research Records, Southern Illinois University, Department of Anthropology, Carbondale, Illinois.

1976 The Salado in central Arizona, with George J. Gumerman. Kiva, Winter Volume, 1976.

1978 SARG and CAEP. Proceedings of the Southwestern Anthropological Research Group, edited by Robert C. Euler and G.J. Gumerman. Museum of Northern Arizona Publication No. 40.

1978 The ceramics of Blair Mound. In An Assessment of Archaeological Resources in the Parr Project Area, by George A. Teague, Institute of Archaeology and Anthropology, University of South Carolina at Columbia.

1979 Pottery chapter. In Las Colinas: Final Report on a Classic Hohokam Mound, with L.C. Hammack, B. Huckell, S. Urban, and N. Hammack (preliminary manuscript).

1979 Archaeological Test Excavation in a Portion of Lot 83 of the Port Bienville Industrial Park, Hancock County, Mississippi. New World Research, Report of Investigations 26.

1980 Contributor, Archaeological Investigations at Flat Bayou Watershed, Jefferson County, Arkansas. Manuscript submitted to Interagency Archeological Services - Atlanta.

1980 Archaeological Investigations at the Fort Gordon Military Reservation, Georgia, with L. Janice Campbell and Prentice M. Thomas. New World Research, Report of Investigations 33.

1980 A Cultural Resources Survey of Houston Pipe Line Comapny's 12 Inch Proposed Pipeline Padre Island, Texas, with Prentice M. Thomas. New World Research, Report of Investigations 30.

1980 Cultural Resources Survey of the Proposed Transcontinental Gas Pipe Line Corporation, 24-inch North Padre Island Pipeline, Texas, with Prentice M. Thomas. New World Research, Report of Investigations 38.

1980 A Cultural Resources Survey of the Proposed Transcontinental Gas Pipe Line Corporation, Padre Island 24-inch pipeline System from Laguna Madre to Falfurrias Oil Field, with Mark T. Swanson. New World Research, Report of Investigations 40.

1981 The Central Coal II Project: a Class II Inventory of Selected Portions of Carbon, Emery and Sevier Counties, Utah, with Prentice M. Thomas, Jeffrey H. Altschul. New World Research, Report of Investigations 26.

1981 Contributor, Cultural Resource Investigations Redstone Arsenal, Madison County, Alabama, edited by Prentice M. Thomas, Jr. New World Research, Report of Investigations 25.

1981 Contributor, Cultural Resources Survey of the TransAnadarko Pipeline System, Texas, Oklahoma, Arkansas, Louisiana. New World Research, Report of Investigations 37.

1981 Cultural Resources Survey of the Proposed Coral Petroleum Sprint Field Exploratory Well Number 1, with Prentice M. Thomas. New World Research, Report of Investigations 43.

1981 Cultural Resources Survey of Proposed Well Sites and Access Road State Oil and Gas Lease No. 82053 Mustang Island, Neuces County, Texas, with Susan Fulgham. New World Research, Report of Investigations 44.

1981 Contributor, Results of a literature and background search for the proposed Low BTU Pipeline, east central Texas. New World Research, Report of Investigations 58.

1982 Literature Review and Cultural Resources Survey of the U.S. Coast Guard Station, Jupiter Inlet, Palm Beach County, Florida. New World Research, Report of Investigations 59.

1983 Background and literature review of three proposed alternatives, Bossier, Caddo, DeSoto and Webster parishes, Louisiana, Harrison and Marion counties, Texas, with L. Janice Campbell, Mark T. Swanson and John E. Keller. New World Research, Report of Investigations 93.

PAPERS PRESENTED

Black Mesa, Salvage Archaeology in Northeastern Arizona, paper presented to the Southwestern Archaeological Association Meeting, Las Vegas, Nevada, 1969.

The Hohokam of North Central Arizona, with A.E. Ward, paper presented to the Society for American Archaeology, Mexico City, 1970.

Classic Period Hohokam Lithic Assemblages, paper presented to the Society of American Archaeology, Miami Beach, 1972.

A Model of Centralized Redistribution, paper presented to the Society for American Archaeology, Washington, D.C., 1974.

Ultra-High Altitude Imagery and Archaeology, with George J. Gumerman, paper presented to the Society for American Archaeology, St. Louis, 1976.

Late Archaic Occupations in the Sand Hills Region of Georgia: Application of the Focal-Diffuse Model, with L. Janice Campbell and Prentice M. Thomas, Jr., paper presented at the Southeastern Archaeological Conference, Ashville, North Carolina, 1981.

A hypothetical reconstruction of prehistoric settlement on Sanibel Island, Florida, with L. Janice Campbell, paper presented to the Florida Anthropological Society 35th Annual Meeting, Tallahassee, 1983.

Settlement and subsistence at Spratt Point: an investigation of two sites in Indian River County, Florida, with L. Janice Campbell, paper presented to the Florida Anthropological Society 35th Annual Meeting, Tallahassee, 1983.

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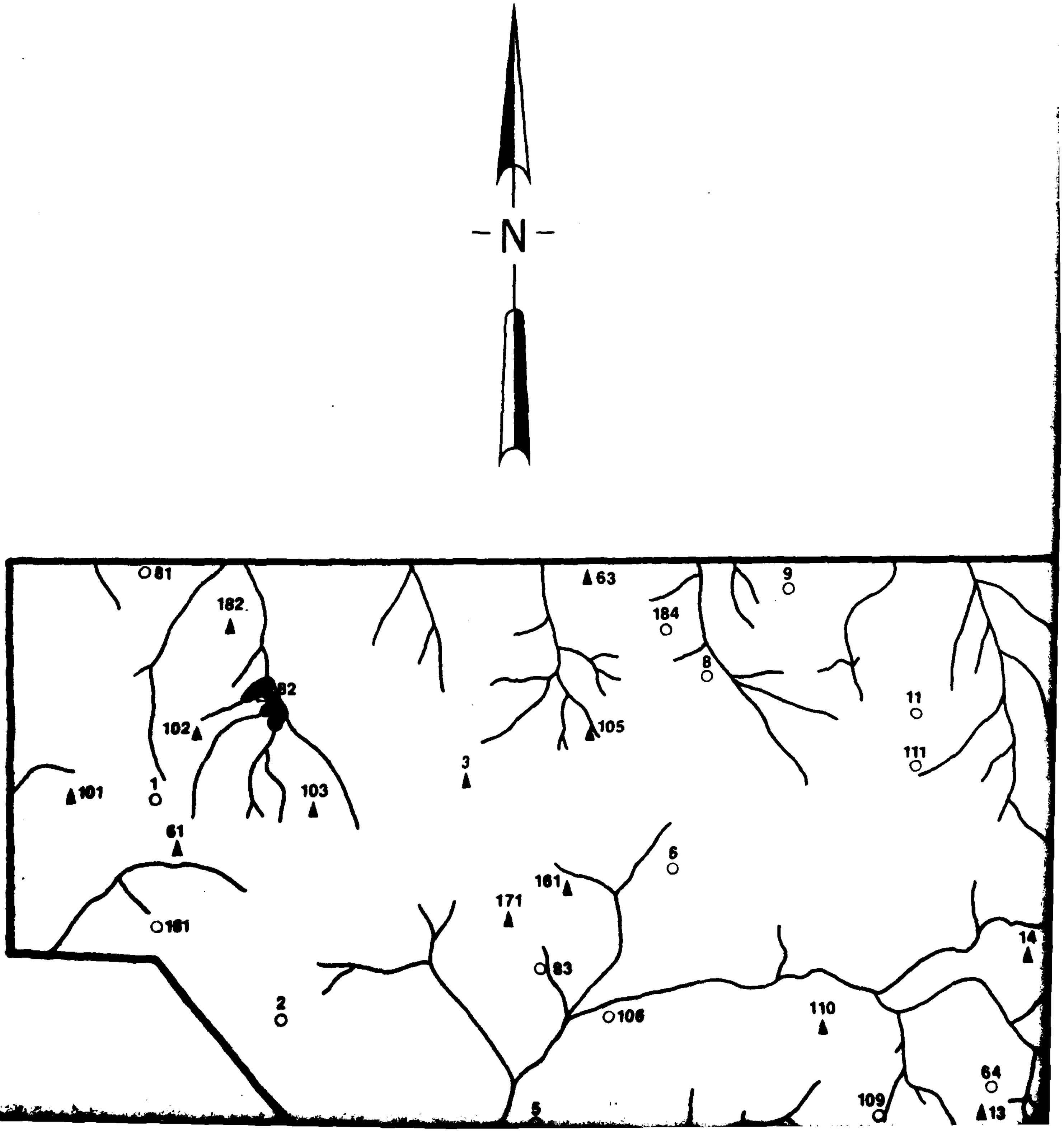
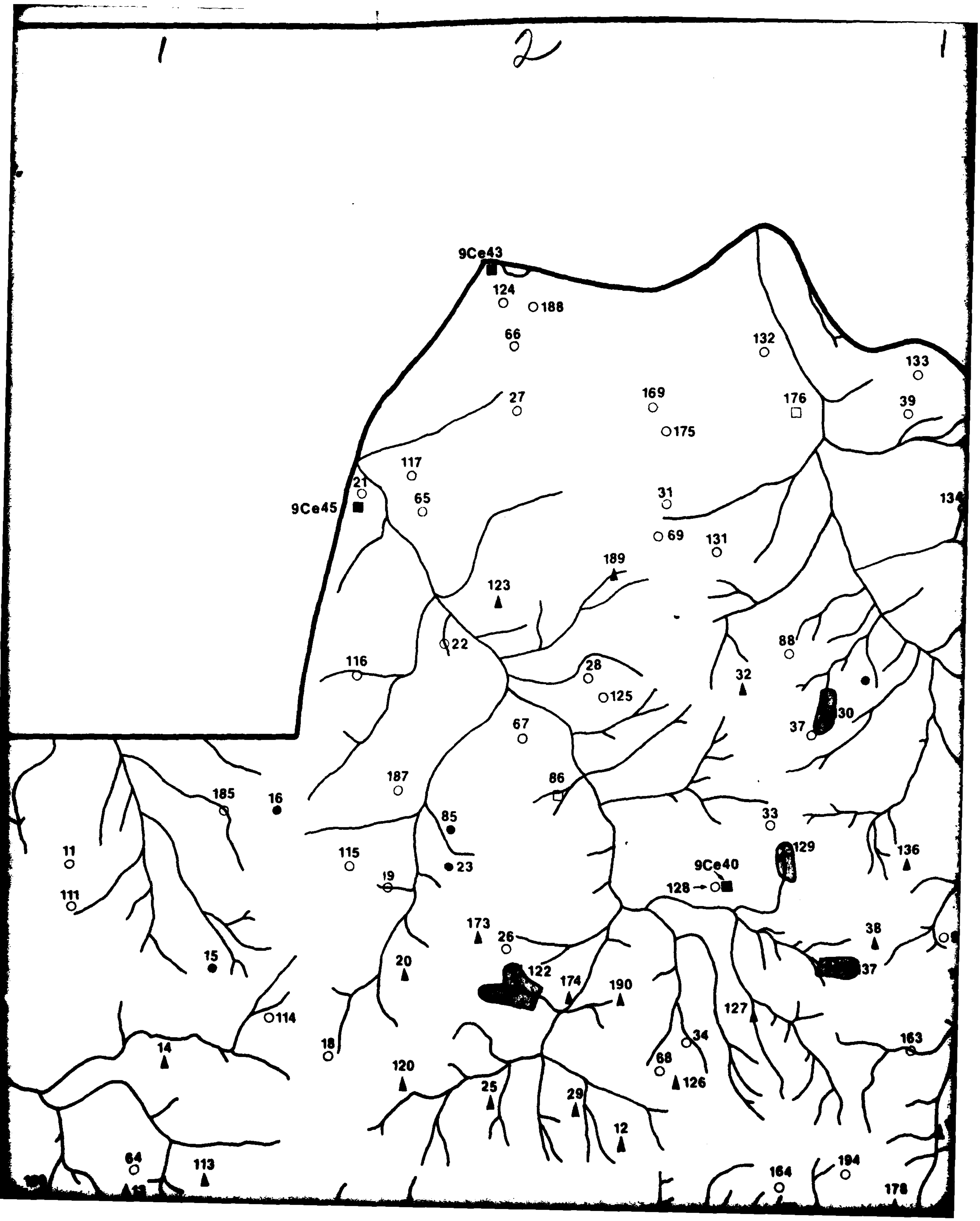
Results of the SECOND DISCRIMINANT ANALYSIS, 22,000 Ac. Proposed Maneuver Area

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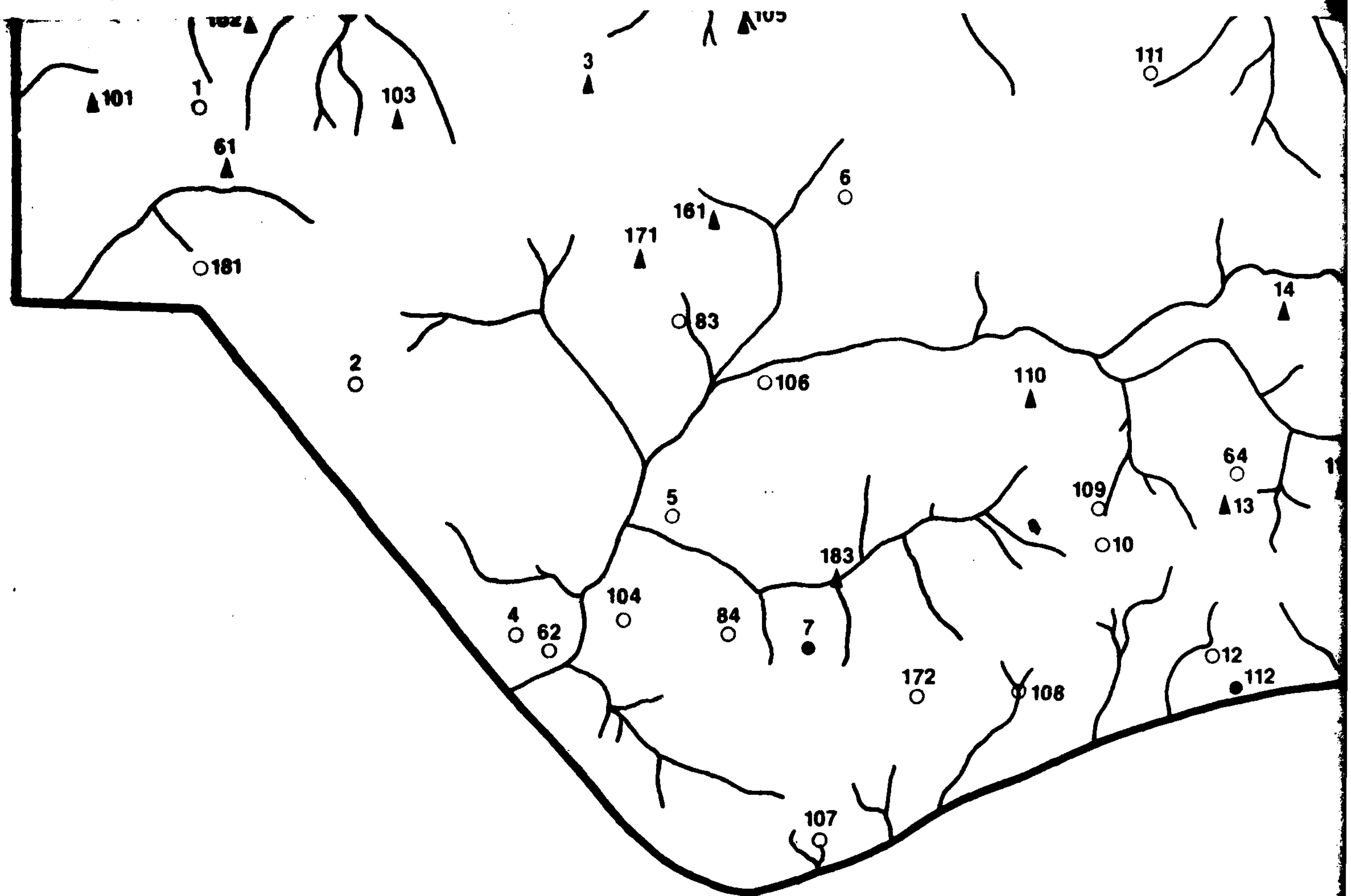
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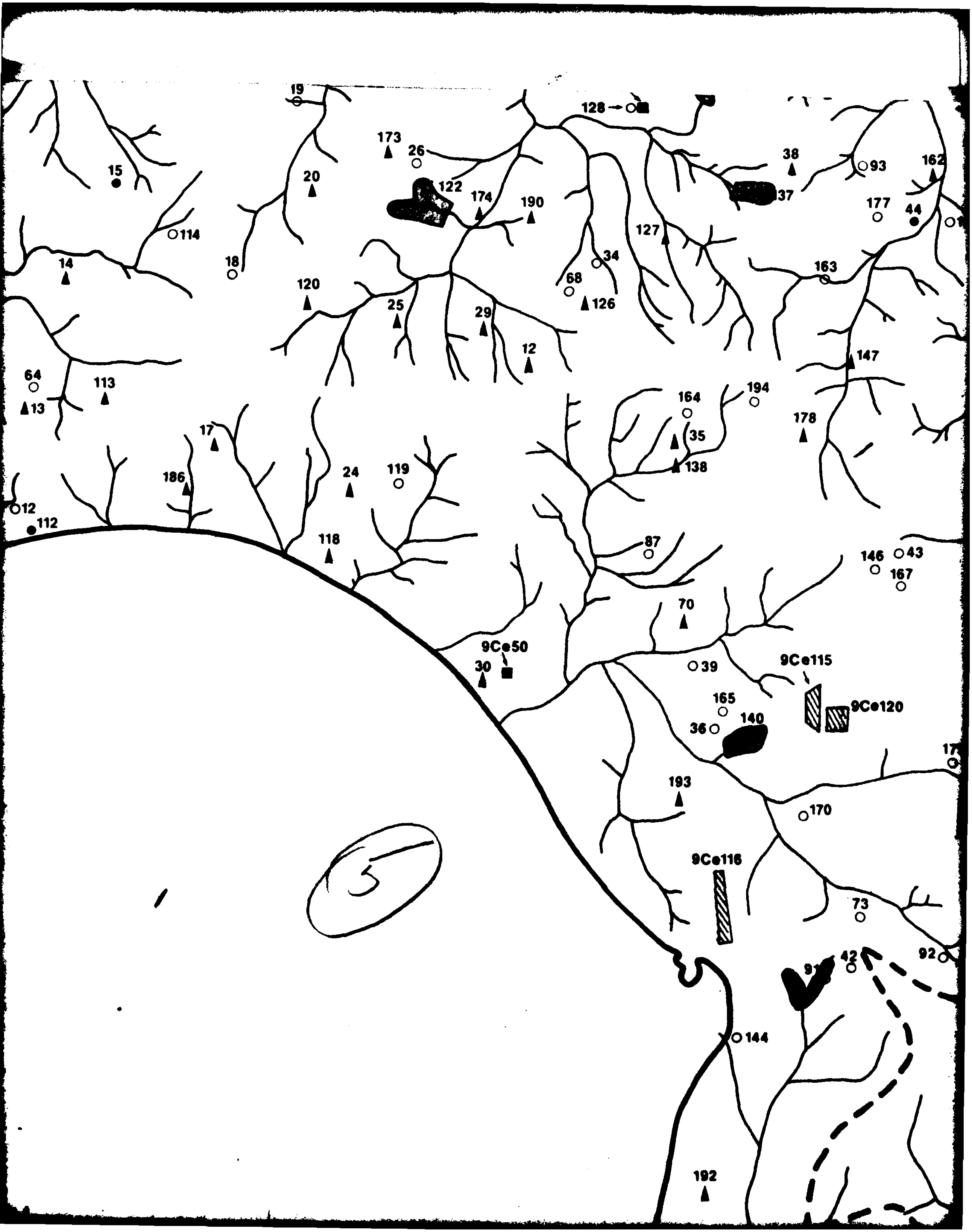

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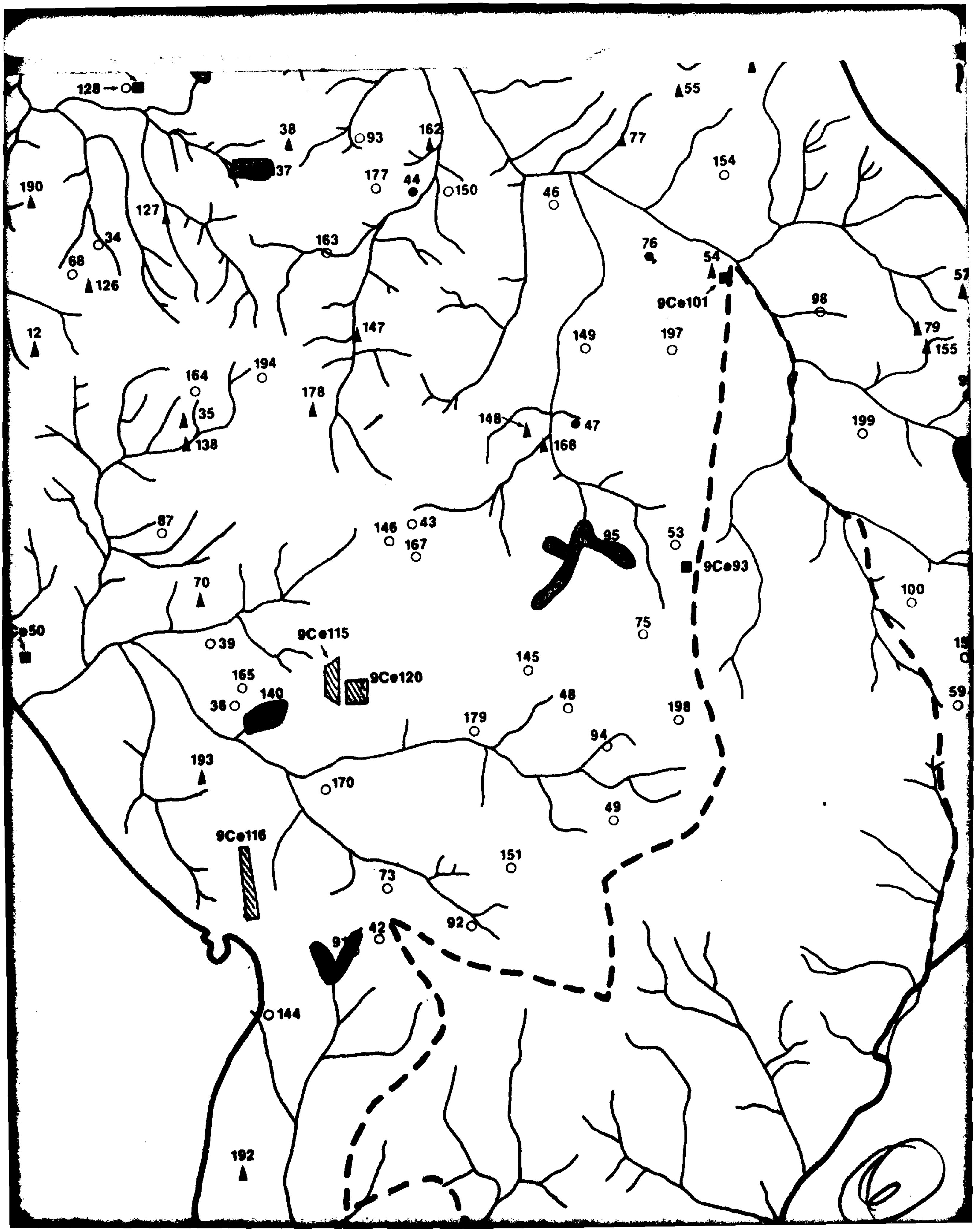
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49
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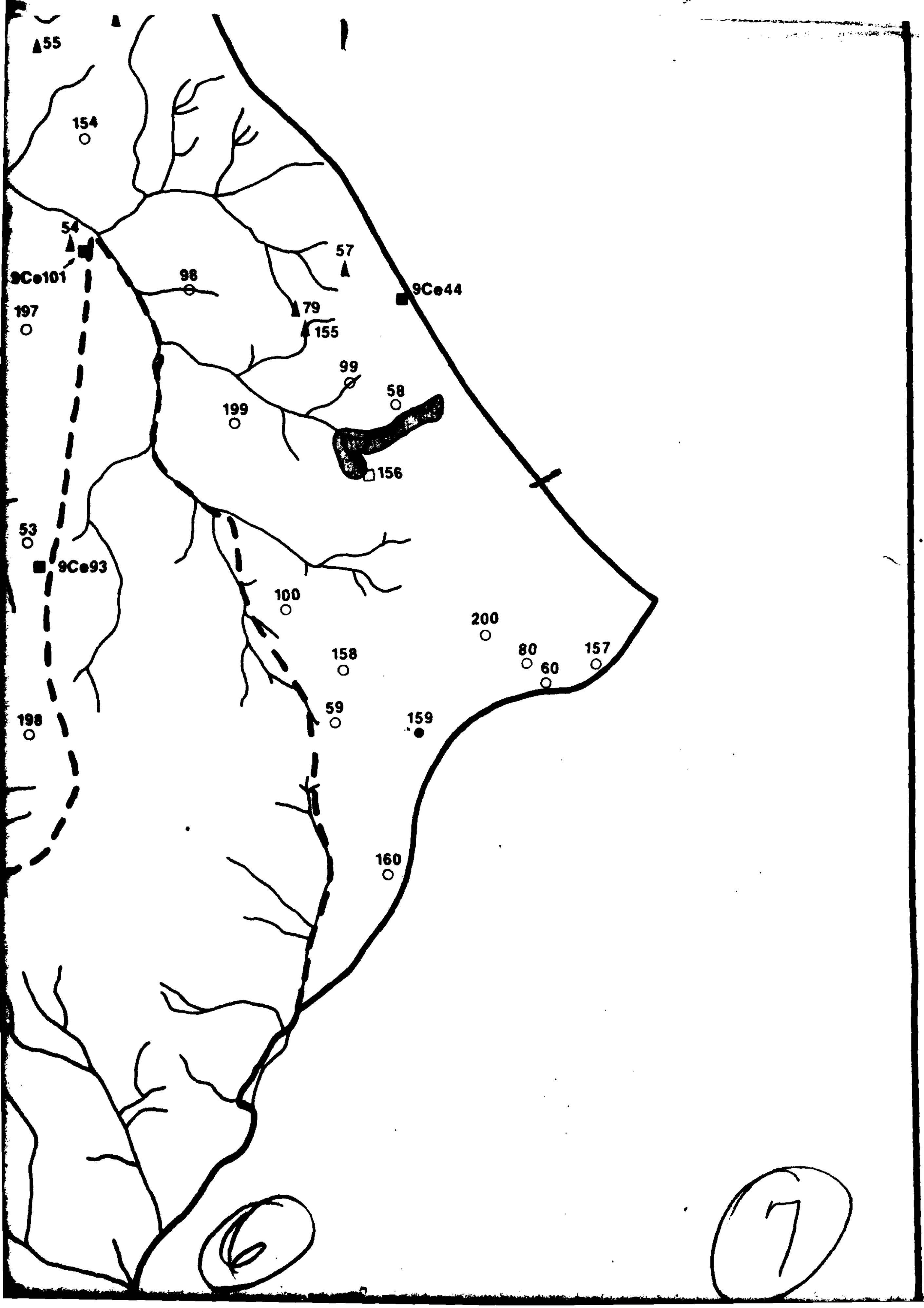

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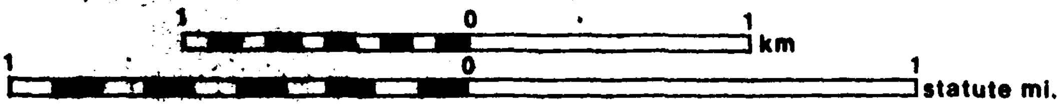

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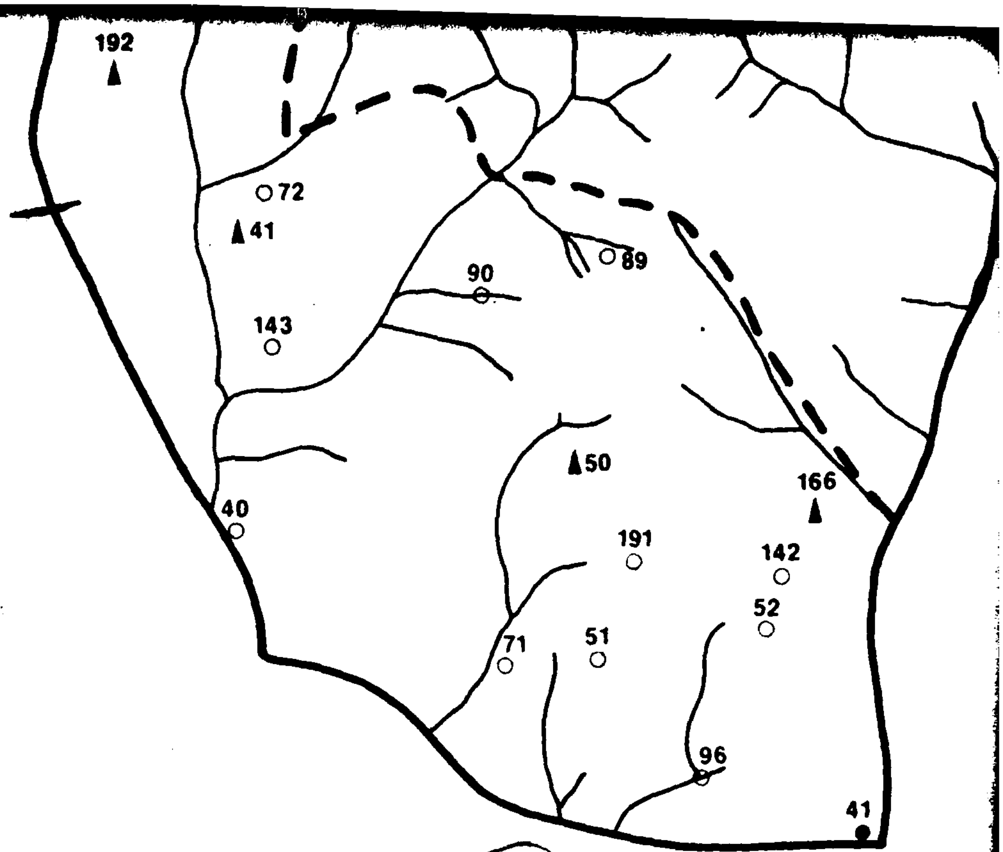

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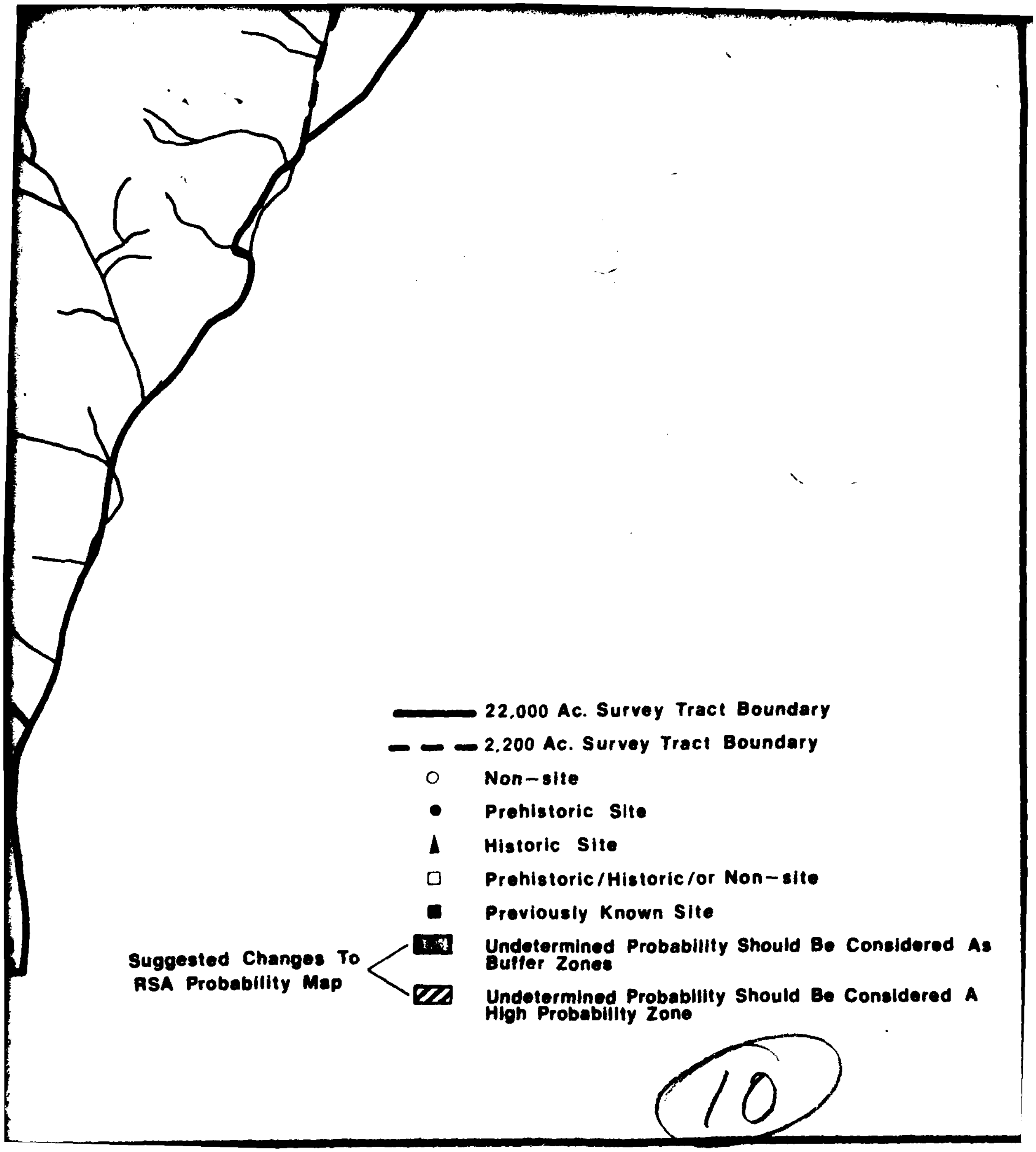
22,000 Ac. Survey Tract Boundary
2,200 Ac. Survey Tract Boundary
Non-site
Prehistoric Site
Historic Site
Prehistoric/Historic/or Non-site
Previously Known Site
Suggested Changes To RSA Probability Map
Undetermined Probability Should Be Considered As Buffer Zones
Undetermined Probability Should Be Considered A High Probability Zone
10